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CLINICAL MEDICINE.

AN

INTRODUCTION TO THE STUDY
OF
CLINICAL MEDICINE:
BEING A
GUIDE TO THE INVESTIGATION OF DISEASE.

For the Use of Students.

BY

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PREFACE.

THIS Manual assumes no more than to point out to students a method—not the only, or necessarily the best, method—of interrogating patients at the bedside. It goes upon the supposition that there are certain remarks and suggestions which, while they hardly fall within the province of set treatises, may yet be usefully interposed between the book description and the study of the living thing.

It is the essence of my plan that the student should be credited with the knowledge he already possesses, and not have rehearsed again what he may be fairly supposed to have learned already. The notes appended to certain portions of the examination—and especially to the part relating to the Chest—are, unfortunately, of some length; but I have nowhere forgotten the design with which I first started, and, while endeavoring to accompany the pupil in each step of the inquiry, have been always studious to avoid the direct teaching of the text-books.

With the tendencies of the present day there is need, I believe, to lay stress upon the fact that it is less by the use of subtle arts and intricate instruments than in the exercise of common observation, directed by method, that the phenomena of disease are revealed. Without dwelling, therefore, upon the refinements of the subject, I have endeavored all the while to lead up to them, and to encourage the learner by his early success, and the acquisition of the rough outline, to proceed further to fill in the details.

Slight as the work is, I cannot but be sensible, on reviewing it, that it falls far short of the intention with which it first sets out. I can only hope that its defects may be such as admit of remedy, and that they may be partly excused on the ground of the novelty of the plan and the wide range of the subject.

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CLINICAL MEDICINE.

I.

THE SORT OF HELP NEEDED BY THE STUDENT AT THE BEDSIDE.

It is the experience of all clinical teachers that pupils who have been taught the principles of medicine or surgery by means of formal lectures, find themselves very much at a loss when called upon to investigate disease at the bedside. Their theoretical study suggests so many points for inquiry, that they stand in doubt where to begin.

This perplexity, it may be said, implies no more than the want of some prearranged plan which shall place in order all the phenomena which have to be reviewed. The student may either be left to himself to construct such a plan, or some method of procedure may be devised for his use. Believing that the latter system is to be preferred, I propose to draw up in some convenient order the chief points which claim attention in the clinical examination of a medical patient.

In attempting so much I do not venture to suppose that any such plan can be so framed as to suit everybody. So soon as the student has acquired the art of putting questions, he will have gained along with it a preference for some particular mode of clinical examination. Practice soon teaches him which method of inquiry yields the best results. The only legitimate aid that can be rendered him is by means of some tabular arrangement, which shall serve as a pattern at the outset, and afterwards be either neglected altogether as no longer necessary, or so shaped to the bent of his own mind, and modified by his growing experience, as to become in fact his own possession. The advantage to the student of being thus provided with certain directions as to the route to be travelled is not confined to the mere saving of time; it insures as well his correct apprehension of the precise scope of the inquiry, and corrects that narrow and partial view which some are disposed to take of the province of diagnosis.

Such considerations would seem to justify the use of books upon this special subject, in addition to those which teach the principles and practice of medicine. Nor is their value to be denied. The objection to them is that, while they repeat to the student much that he knows already, they tie him down too rigidly to a particular mode of procedure. What is wanted is intimately mixed up with what is superfluous, and the conclusions are too absolutely stated. It is out of place in a book that is to succeed and supplement the teaching of the lecture-room, to rehearse once more the elementary facts of practical medicine, presenting, indeed, the same subject over again in a simplified and more familiar shape. Such treatment the instructed student may properly resent.

It is beside the purpose to offer for his instruction diagrams in explanation of the various chest-sounds, or short and imperfect summaries of pathological conditions, or expeditious methods of testing the secretions. If he is fitted at all for clinical study, he knows these things already, and should be credited with knowing them; to reiterate them with a parade of simplicity is wasteful and inopportune, and gives to works which are otherwise valuable, much of the aspect of cram books.[1]

Might it not be possible, I have thought, in a smaller space and with less of dictation, to supply the student with just so much help as he needs, and no more; to give such general instructions as should indicate the direction of his path without pointing at every turn to the old footprints, and compelling him to walk precisely in the same track? There is implied in the preliminary training requisite for the correct observation of disease, a general acceptance of certain fundamental doctrines; but there needs as well the spirit of independent inquiry. So soon as the principles have been instilled, it seems desirable that the student should have liberty in the next place to compare the reality with the description. The teacher who has shown as yet only the picture, may now stand aside and suffer the pupil to observe the thing itself from his own point of view.

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[1] As examples of the mode in which the subject is treated in books devoted to it, the works of Dr. Barclay and of Dr. Fenwick upon medical diagnosis might be mentioned. The one (Dr. Barclay's) is a very careful discussion of the weight to be attached to the phenomena of disease under the different circumstances in which they arise, and is valuable both for the actual information it contains, and for the philosophical spirit which pervades it. The other (Dr. Fenwick's) is an attempt to state categorically, in a compendious form, for the guidance of the ignorant, the meaning of symptoms, and to translate these into the terms of a nosological table. Given such and such symptoms, the disease is, or ought to be so and so. You recognize certain appearances, and you turn up the book to know what they mean. Any one who reflects for a moment upon the great diversity of phenomena which disease exhibits, will see the impossibility of harnessing symptoms to morbid conditions in this peremptory way; and any one who reads Dr. Fenwick's manual (admirable as it is in arrangement and expression) will perceive that he has not succeeded in an impossible task; that the symptoms he groups together may or may not deserve the name he attaches to them. The book stops short just at the point where special guidance is most needed—at the exceptions.

It would thus seem that the kind of help to be offered to the clinical student should be rather by way of suggestion than by direct teaching. The book, if book it must be, should aim at supplying, in its imperfect way, the place of the teacher at the bedside, it should impress the value of signs which students habitually neglect, and provide cautions against common errors and hasty conclusions. In repeating the lessons of the lecture-room, it mistakes its purpose and intrudes upon occupied ground.

It is easier to point out in such general terms the sort of aid that the student needs, than to supply the precise measure of it which shall prove useful. There is no great difficulty in setting forth in some convenient order the several points upon which the patient is to be questioned, but to append under each heading certain cautions and directions, with no bias towards any particular class of diseases, and the mind, attentive alike to every avenue for mistake, is full of difficulty. Anywhere the occurrecce of a particular word or phrase may lead the teacher astray; his range of view is never coextensive with the field which his remarks should cover; the points to which he draws attention will often be deemed trivial by the side of others which are left unnoticed; so various are the subjects to be encountered, so wide the divergence of opinion as to the relative importance and obscurity of the signs of disease.

It may be taken for granted, I think, that no chart or book of instructions can foresee or provide against the many difficulties and sources of error which beset the student in his first analysis of those complex phenomena which are so precisely detailed to him in formal treatises. It should, in fact, be frankly admitted at this stage of his career that the obscurity and doubt in which he finds himself is not wholly due to his own inexperience, but also, in a measure inherent to the subject itself. The explicit statements and sharply-defined distinctions and classifications of the books have no precise counterpart in nature. It is right and fair that the student should know that there is more of uncertainty and failure and surprise in actual practice than he would be led to expect from systematic lectures, and not be left to overrate the really wide difference between his own early powers of diagnosis and the degree of precision of which the subject is capable.

The task to which I now apply myself may fail so completely of accomplishment as to render needful some fuller statement of its design. I propose, then, to enumerate in some convenient order the particulars which have to be learnt in every clinical examination, whether by questions addressed to the patient, or by direct observation of his present condition.

To the several headings I would append, by way of commentary, such cautions and general directions as seem most necessary to guard the student against those errors and omissions to which he is most prone. I would avoid as much as possible dogmatic assertion, or any attempt to connect isolated symptoms with specific forms of disease. Crediting the student with adequate knowledge upon certain matters of fact, I shall repeat nothing as to the topography of the viscera or their morbid anatomy, or the tests employed in examining the secretions: my sole reference to such points being directed to protecting him against drawing false inferences from the phenomena which he elicits. With the knowledge he possesses, I would seek to train him by degrees to the exercise of his own judgment, not to burden his memory with statements of mine, which must be often false, as to the precise meaning of this or that symptom or group of symptoms.

It is difficult, perhaps, to enlist the favor of learners on behalf of a guide who thus formally disclaims all intention of teaching them anything. But in our science the acquiring of the facts is one thing, and the training necessary to make them available is another thing; and, true though it be that this training must be mainly a personal matter, I am not without hope that here and there the process may be aided a little from without by a timely hint or caution.

The remarks which are to follow, therefore, must be taken somewhat in the light of an experiment. They interfere with no one, and do not attempt to do better what has often been done before. In the present day students are, perhaps, too ready to believe that skill in the use of implements, and familiarity with the many modern aids to diagnosis, may take the place of that careful scrutiny of the patient which was necessary in darker times. I shall not wholly fail of my purpose if I can so present the scope and object of the problem before us as to make it obvious that the same care and practice and patience are necessary for its solution as for the discovery of most other things which are worth the knowing; that the characters of disease are not to be recognized by the reading of a book, or by the application of any registering instrument at present known to us.

THE PLAN.

- *A*. The General Survey.
  - 1. The Patient's Narrative and Appearance.
    - The name, age, and state.
    - The family history, in reference to hereditary diseases and characteristics.
    - The history of the individual.
      - I. Anterior to the present illness.
      - II. In connection with the present illness.
  - 2. Personal Observation and General Survey of the Functions.
    - The posture and aspect.
    - The temperature and condition of surface.
    - The present state of—
      - Innervation,
      - Digestion,
      - Circulation,
      - Respiration.

B. The Examination of Regions.	3. SPECIAL EXAMINATION (CHIEFLY PHYSICAL) OF THE SEVERAL ORGANS OF THE BODY. Condition of the brain and nervous system. Examination of the organs and vessels of the thorax. Examination of the contents of the abdomen.
C. Examination of the Secretions and Evacuations.	4. PHYSICAL AND CHEMICAL EXAMINATION OF THE PRODUCTS OF THE BODY. Analysis of the urine, &c. " " evacuations.
D. The Diagnosis.	5. GENERAL SIGNIFICANCE OF THE SYMPTOMS. Review of the phenomena just observed in their relation to one another.
E. The Treatment.	6. THE CONSIDERATION OF METHODS OF RELIEF. The same phenomena considered with reference to our means of controlling or modifying them.

II.

SOME GENERAL RULES IN REFERENCE TO THE EXAMINATION OF PATIENTS.

In an inquiry of this sort, which has for its object to investigate a patient's condition partly by observation and partly from his own account of himself, the precise method pursued is unimportant, so long as it is complete and consistent. Thus, we may either examine the patient's present condition in the first place, and afterwards, by questions addressed to him, get some account of his symptoms and antecedents, or otherwise we may learn his history first, and, guided by it, make our own investigation subsequently. Let it only be remembered that the two operations are distinct. In hospital practice the student will do well to practice both methods. The plan of observing for himself in the first instance, apart from any information supplied by the patient, will teach him confidence in the numerous cases where a diagnosis has to be made under those circumstances. At the same time it is to be urged in favor of the arrangement I propose to adopt, that the patient's own account of himself is only a legitimate help to the inquiry, and may so direct it as to save time without the sacrifice of accuracy. Moreover, it is more natural and agreeable for the patient to be suffered to tell his own tale rather than that through a long silence his body should be explored to discover some defect which perhaps after all can only be learnt from his own lips. With children there is the incidental advantage in learning the account which the nurse has to give before handling the patient, that by this method the child itself is approached gradually, and not personally interfered with until its first alarm has subsided. It may be added that this plan of procedure takes note of the facts in the actual order of their occurrence, and is the method which would always be adopted in recording cases.

In interrogating the patient, it is to be remembered at the outset that his statements are to be viewed in the light of his frame of mind at the time of examination.—It will soon appear whether his replies are exaggerated or understated; whether, consciously or not, he is coloring his narrative according to a preconceived theory of his own. Most patients frame for themselves a complete hypothesis as to the cause and nature of their maladies, and would thus anticipate or bias our own conclusions in these respects.

It is very desirable to keep one's own judgment open, and avoid rushing to conclusions from single circumstances.—It must always be difficult, when once a symptom has been interpreted in a particular way, to deal quite fairly by the others. When a diagnosis is thus hastily reached, and certain leading questions are put with a view to test its correctness, the patient, discovering the drift of such interrogation, is apt to fall in with the implied views of his questioner, and to answer as he feels himself bidden.

Patients often embarrass the student by taking him out *of his course in the inquiry.*—A symptom or incident touched upon will suggest to them much irrelevant matter, which it is difficult to restrain; they become narrators merely, telling their story in their own way, and not in the manner here prescribed for them.[1]

The pupil is often unconsciously influenced by certain external things, which ought properly to be laid out of the case.—Thus, for instance, the finding the patient in bed is taken to imply a certain gravity in his symptoms, yet the amount of inducement needed to keep an individual to his bed varies so much that we are not justified in assuming anything from the fact that he is found there. Or, again, the patient has some vague suspicion attaching to him which the mind, without further inquiry, converts into evidence; he comes from a special hospital, or he has been treated by a drug which suggests a specific affection, or his friends urge their own beliefs with regard to him. It is obvious, upon reflection, that a knowledge of these circumstances tends only to bias the judgment; that they ought in fact to be neglected.

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[1] The student will not fail to notice that the language employed by patients to express similar conditions is different for the two sexes. The women are more emphatic and metaphorical than the men, and their sensations are less easily localized or pictured to the mind: they have "cold flushes," and "heats," and "sinkings," and their children when feverish are "as hot as a coal." The men are more apt to point to the seat of their misery, and complain that this or that act or movement is difficult or painful. Education, of course, tones down this variety of expression, but it seldom obliterates it. Nor is the difference one of expression only. Sometimes, indeed, the male may be found adopting the hyperbolical phraseology of the other sex. This circumstance is, as I believe, a valuable diagnostic sign of hypochondriasis. For the reasons given, as well as because women are more voluble than men, and more prone to insist upon causes, the study of disease is easier in the male than in the female.

Certain only of the patient's statements can be verified by personal observations; for what he says relating to his own sensations and antecedents we have nothing further than his own warrant, assisted by our own estimate of his power of observation and habit of accuracy. Moreover, the rapid changes and vicissitudes which form so important a feature in the history of acute diseases can only be known by continued watching. Seen but once in the day's revolution, the course of the symptoms must be very imperfectly apprehended, and their gravity either exaggerated or underrated. Again, in periodic and in paroxysmal affections, the condition of the patient in the intervals affords no clue whatever to his condition during the fits. Even when the disease is fixed and equal, there is often enough of excitement produced by the questioning to mask for awhile the patient's actual state.[1]

It is another element of difficulty when the patient is a stranger to us, and his habitual state when in health

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[1] Acute disease has some advantage over that which is chronic in the present interest which it excites. In chronic disease, but little of the whole matter comes under our own observation; the history spreads over an indefinite period; we have to weigh evidence, and analyze laboriously the facts of the past. The changes are slow, and the result may be very distant. In acute disease, on the contrary, the whole or most of the story is enacted under one's own eye, phenomena follow each other in rapid succession, the changes can be watched from day to day, and the result is a matter of present concern, which we are ourselves to witness.

is unknown.—True, in every clinical investigation the inquirer keeps steadily in view the general standard of health; it is, of course, only by comparison with it that observations upon disease can have any precise value. Yet the term "health" does not imply, except in theory, an absolutely fixed state necessarily the same for everybody. To estimate illness, therefore, in any individual, we must first form some notion of his habitual condition,—of that which passes for health in his particular case.

There are, of course, certain points in the order of the interrogation which follows which will require modification to suit particular cases. Some diseases reveal themselves at once by signal phenomena, and some demand a special investigation of their own. It will be remembered, however, that affections owning a common name differ sufficiently amongst themselves to prevent our assuming this or that of them without a systematic investigation. The student must never delude himself into the belief that his work is done because he has found a name for the patient's disease.

III.

THE GENERAL EXAMINATION OF THE FAMILY AND PERSONAL HISTORY OF THE PATIENT.

- Name, Age, and State.
  - Occupation; social state.
  - (With women) number and ages of children; dates of miscarriages.
- Family History.
  - Existence of hereditary disease, as gout, phthisis, insanity, cancer, asthma, &c.
  - Hereditary characteristics, as to longevity, tone of health, susceptibilities, &c.
- Personal History.
  - 1. Anterior to present illness.
    - Infantile and other attacks, with reference (1) to the structural changes occurring thereupon; (2) to an acquired proclivity.
    - (With women) particulars of miscarriages or premature births, difficult or prolonged labors, overlactation, special circumstances or diseases in connection with childbearing; history of the catamenia.
    - (With infants) circumstances of food and clothing.
    - Habits and idiosyncrasies of the individual.
  - 2. In connection with present illness.
    - (*a*) Date and manner of the first deviation from health.
      - Whether (1) sudden invasion of illness more or less acute, *e.g.*, with shivering pains in the limbs, &c., or (with infants) slight convulsion; or (2) gradual accession of illness, to which no precise date can be fixed.
    - (*b*) Prominent features of the illness.
      - *e. g.*, Rapid wasting, profuse night-sweats, utter sleeplessness, altered mental state, mere debility; pain, whether paroxysmal or fixed, or attending certain movements; remarkable change in the character of any secretion, &c.
    - (*c*) The general course of the illness.
      - With reference to its increasing or decreasing severity; its habit, fixed or varying character, and apparent seat; its dependence upon locality, or contagion, or temperature, or season, or mode of life.

The entry of the actual age of the patient not only discovers those who, for some cause to be made out, are prematurely old, but brings to mind as well certain classes and varieties of disorders appertaining to particular periods of life. The developmental changes of infancy and puberty, the decline of activity in the reproductive organs of the female, the structural degenerations of old age, express themselves by certain phenomena, and lend something to the expression of disease. The patient's age is noted with reference to these critical periods. Along with it we may learn, of the female (with more or less particularity, according to the nature of the case) the period at which menstruation commenced or ceased, or the particular character of that function.

The patient's occupation or pursuit may or may not have some direct connection with his ailment: we are perhaps too ready to conclude that this is so, and in the case of those trades which are associated notoriously with particular forms of disease, so that the one inevitably suggests the other,—as the business of plumbers, or grinders, or stonemasons, or hired prostitutes,—to lay undue stress upon certain symptoms so as to force them into relation with the diseases which these callings are known to provoke or favor. It occurs naturally to note the particular occupation of the individual in this place: how far that circumstance is significant as bearing upon the case will appear hereafter. With a number of possible causes, each sufficient to account for the symptoms, we are not to start with a bias in favor of any one of them.[1]

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[1] A similar remark might seem to apply to the reception at this

Not only should we learn the particulars of such diseases as are known or supposed to be transmissible, but inquire further into the general characteristics and tone of health of the patient's family.—The importance of such knowledge arises from the fact that, in this respect as well as in others, the individual is likely to resemble the rest of his race. Vague symptoms of hypochondriasis, neuralgic attacks, sudden and otherwise unaccountable failure of the bodily or mental powers at a certain age, are phenomena apt to recur in the same family, and which often receive no further explanation than that such is the habit of the stock; the child is constructed after the same pattern as the parent. It is, indeed, highly probable that in this transmission of the very same characteristics from one generation to the next, the precise phenomena are not always necessarily repeated. The essential condition may remain, but its manifestations may vary as well from one generation to the next, as from time to time in the same individual. The observation can only be applied when the student's own experience has taught him the limits of its truth. What is important in practice is, that no symptom should be considered by itself alone, but always with reference both to its own recurrence and to the symptoms which are in the habit of replacing it.

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stage of evidence as to hereditary disease, but here it is to be said that information upon this point often determines the weight to be given to certain symptoms which without such aid could not of themselves be correctly appreciated. A knowledge of the patient's employment may or may not be needed for the full interpretation of the symptoms. A knowledge of his inherited tendencies is always necessary for estimating their relative importance.

The passage from the family to the personal history is not abrupt; the one inquiry, in fact, includes the other. At the same time, what the patient says of himself and what he says of others, his relatives, are not to be regarded as of equal validity. He may be accurate and candid in the one case, but evasive and reticent in the other. The careful observer will soon learn enough to give direction to his inquiries as to the personal habits of the patient; he may detect an obvious unwillingness on his part to be pressed upon such points, and may, perhaps, judge it best that certain particulars under this head should not as yet be made the subject of direct inquiry.

It is a fact familiar to all physicians that the most important symptoms are often concealed by patients.—In certain forms of disease, and especially in pulmonary consumption, much pressure by questions fails sometimes to elicit the whole truth. Between the readiness and real sense of enjoyment with which a dyspeptic will expatiate upon his sensations, and the reluctance of a phthisical patient in an early stage of his disease to confess that he sweats at night, or has spat blood, there is every shade of difference in the degrees of communicativeness. This circumstance (which is of itself of some diagnostic value) renders it necessary that such symptoms as are popularly regarded as implying grave disease, and particularly the early indications of phthisis, should be searchingly investigated. The remark is, of course, less applicable where disease is advanced and known to be hopeless; nor does it apply, according to my observation, in the case of mere pain, the exact significance of which is hardly ever appreciated by the patient, and, indeed, only with difficulty and frequent failure by the physician.

In seeking definite information as to the nature of former illnesses, we have chiefly in view such attacks as point to the existence of diseases inherited or acquired, and such as of themselves are apt to produce abiding changes in the body.—Hence, amongst the affections of early life which would bear upon the diagnosis are infantile convulsions, chronic coryza, enlarged glands, otorrhœa following scarlatina, hooping-cough, acute rheumatism. The patient's statement, however, that he has had this or that disease, is never reliable, and unless the precise symptoms of alleged attacks can be ascertained, it is best to dismiss this evidence altogether.

"Rheumatic fever," "low fever," "inflammation" of various parts and organs, "diseased liver," and, for children, "croup," are amongst the terms used, especially by the poor, with a very wide signification. Such expressions on investigation often resolve themselves into affections of a quite different kind, or into symptoms so indefinite or so indistinctly remembered that it is impossible to characterize them by any set names. In order to avoid being thus misled, it is desirable throughout to require plain answers to plain questions, and not suffer patients to express their symptoms, past or present, by the use of medical phrases.

Those seizures, which are commonly classed together under the general name of "fits," comprehend a number of phenomena, epilepsy, hysteria, syncope, infantile convulsions, &c., &c.—Whenever in the patient's narrative the word is made use of, much care is necessary to arrive at some accurate knowledge of the thing signified. In the case of the female, for instance, it is often matter of difficulty, and sometimes impossible from the patient's own account, to distinguish between hysterical and epileptiform seizures.[1]

We may expect to learn something of the nature of those "fits" or "strokes" which are associated with one or other of the forms of paralysis, from the account rendered of their antecedents and immediate consequences. Of the seizure itself often no reliable account can be got, but the patient or his friends will be able to describe the state of his health at the time of its occurrence, its premonition or not in numbness or altered sensation, and his condition as to mobility, speech, and intelligence, on its subsidence. The present state of the patient we have to determine for ourselves. The interrogation now is addressed towards determining the length and profoundness of the coma, and (where this has been intelligently witnessed) the color and turgidity of the face, and the character of the breathing and of the movements of the cheeks.

Mere vertigo, sufficient to make the patient stagger, or even fall, yet unaccompanied by any other "head symptom," may sometimes be loosely described as a fit. The real significance of such seizure is often obscure.

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[1] Hysterical women may have epilepsy as well as others, yet the very aspect of these patients may prevent their being credited with the graver disease. It is a valuable aid to find marks of injury upon the patient received in falling, or the tongue deeply bitten. Sometimes a woman will admit the consciousness of pain, or stifling or other sensation during the fit,—an admission fatal to the theory of epilepsy. The antecedents of the fit, its occurring without warning, while the individual was busily engaged, or, more gradually, when unoccupied; and its consequences, confusion of mind, headache, sleepiness, or none of these, are further circumstances to help the diagnosis.

"Fainting" is a very vague expression applied equally to a sudden arrest of all pulsation and respiration, which may be the immediate precursor of death, or perhaps death itself, and to that feeling of languor and depression commonest among delicate or fanciful women, and to some extent within the control of the will. All the degrees of syncope would seem to depend immediately upon a paralysis of the heart, complete or incomplete, temporary or abiding, and all agree in depriving the patient (for the while, wholly or partially) of sense and motion, while the slow and laborious action of the heart is heard either very faintly or not at all. True syncope is temporary death, and its continuance is incompatible with the life of the individual.

The convulsions of childhood are in some respects analogous to the rigors of later life, inasmuch as they often usher in acute affections.—They may be so transient and partial (as when confined to the thumbs, which are drawn in upon the palms) as to be lightly regarded by the mother, or even altogether overlooked.[1] The term "inward convulsion," or "fits inwardly," is sometimes used by nurses where no muscular spasm has actually taken place, save only some twitching of the lips and eyelids.

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[1] Convulsion in infancy is to be severed altogether from the same symptoms in the adult, arising as it does with less provocation from a far wider range of circumstances. It is due in many cases to an eccentric irritation, as the overloading of the stomach or bowels, or the cutting of teeth, conditions to which every infant is liable. It is in the abidence of this symptom, when its apparent cause is removed, or its occurrence in subjects who have other

In all the illnesses of children it is not to be forgotten how important an element in the history is food and clothing.—Amongst the poor there is an extraordinary ignorance as to the kind of diet suitable to childhood, and, as a consequence, a very large proportion of the infantile ailments and actual mortality of this class arises directly from improper food, and subsides so soon as this is rectified. The questions addressed to mothers under this head should be directed to such points as the following: the state of their own health and the quantity of milk secreted during lactation, the period at which the child was weaned, the sudden or gradual withdrawal of the mother's milk, and the kind and quantity of food substituted.

In taking a general survey of the history of the present illness, it is important to ascertain distinctly its precise character at the commencement.—For when disease is of long standing it may lose the distinctness which it had at first, owing to many secondary changes;

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signs of nervous disease, or arising as a new feature in the course of an acute affection, that we recognize its gravity. It is of the highest importance, therefore, whenever convulsion is alleged, to inquire minutely into the state of the child's health and functions immediately before the fit. When the frame of the child or its state of nutrition or this occurrence of convulsion leads to a definite suspicion in regard to it, it is always proper to inquire how it sleeps, as with half-shut eyes, twitching the face, grinding the teeth, or burrowing with the back of the head into the pillow.

its real nature and affinities are then only to be made out by taxing the patient's memory for an account of the symptoms with which it first started. In the case of an acute disease the history is likely to be sufficiently definite, but in chronic affections the initial symptoms may be almost forgotten by the patient, and, whether or not, he is likely to slur them over as things of the past, having little reference to his present state. It may be that the declension from health has been so gradual and insidious that there is hardly anything to tell, yet even this evidence is of value in so far as it limits the range of the inquiry.

In acute disease, and especially those which run a tolerably uniform course, and exhibit critical phenomena at certain stages, the import and bearing of any symptom observed can only be estimated by reference to the precise period of its occurrence.—The same signs acquire different values according to their position with regard to certain fixed points in the history of the illness. It is necessary, therefore, in such cases, to ascertain the exact duration of the illness, and the chief incidents which have marked its course thus far. It is only by so doing that we are enabled to distinguish between the phenomena of the disease and its accidental complications.

Where the disease is recurrent, as in gout and pure asthma, we may ascertain from the history of former attacks what is likely to happen in the present. There is, indeed, in the case of all chronic disease much that concerns *the habit* of the complaint, as exhibited in the individual sufferer, which must be learnt directly from the patient himself.

There is no symptom which requires more careful examination than pain.—Its prominence as a symptom is often quite out of proportion to its value as an aid to diagnosis; for while it is impossible either to suffer or witness pain without assigning some cause for it, the explanation is often mere guessing. To the beginner pain, especially that which is fixed and acute, will always suggest some change in the structure or relationship of parts, and he will thus be led to suspect inflammation or ulceration, or obstruction or pressure, in so large a number of cases that the very frequency of the suspicion will at last assure him of his error.

The cause of pain from first to last is often conjectural.—Its nature may of course be learnt in many instances by considering its character and surroundings. Thus pain, which is periodic, or which arises upon certain movements, including those of respiration and of convulsive cough, or which is simultaneous with certain stages of the digestive process, or with fulness or emptiness of the hollow viscera, may be partly explained by these associations.

Or again, there may be *tenderness* as well as pain. The sensation of the part to the touch, or its appearance to the eye, may be altered in some way or other which is instructive. It is mere pain which is so puzzling. The *kind* of pain is sometimes sufficient to mark its origin, as the pain of colic, and, from its very intolerableness, perhaps the pain of the passage of a gallstone or renal calculus. It remains true, however, that pain alone is insufficient ground for diagnosis. Perhaps the most common error in regard to it is that of referring it in all doubtful cases to rheumatism, or neuralgia, as though pain unattended by any further symptoms might always, in the last resort, be thus accounted for.

It is to be remembered that there are pains (sometimes very distinctly localized, and of which, accordingly, the patient will demand some particular account) which can be explained no further than as being part and parcel of a general affection. Such are the lumbar pains of small-pox, and the limb and joint pains which usher in the fevers.

Along with a pretty even course of illness—the patient, to his own feeling, getting neither better nor worse—there may have occurred some notable change in the character of a secretion.—This he may pass over as trivial unless special inquiry be made upon the point. For example, the urine may have increased or diminished considerably in quantity, a circumstance which will often excite less attention than its change in color, or its leaving a deposit on cooling; or the sputa, from being colorless and watery and frothy, may alter to a thick yellow consistence, the cough meanwhile becoming less irritating, and the symptom being regarded as rather favorable than otherwise. Facts of this sort are among the prominent features of the illness and an essential part of the patient's narrative, yet they have often to be elicited by questions.

IV.

EXAMINATION OF THE FUNCTIONS.

Present state.	1. Aspect and posture.		Aspect suggestive of any special disease; of melancholy or anxiety, weariness, or excitement, or terror, &c. Posture assumed in bed. Convulsive or twitching, or choreic, or nervous movements.
	2. Innervation.		The articulation, gait, symmetry of face and eyes, integrity or otherwise of the special senses and of common sensation.
	3. Temperature and surface.		Temperature of the body in various parts; comparison of the temperature of the two sides; of the head and of the limbs as compared with the trunk; the general shape and outline of the abdomen, its movements with respiration; detection of œdema, and inspection of anterior surface.
	4. Digestion.	(*a*) Appetite for, and power of receiving nourishment. (*b*) Tongue, gums, and palate.	Mode of protrusion of the tongue, whether straight or oblique, &c.; its being steady or tremulous; observation of its color, coating, papillæ, state of surface, abrasions, &c. Color, smoothness, and moisture of lips. The gums colorless, spongy, marked with a blue line, &c.
		(*c*) The alvine discharge.	The patient's account of the color, consistence, and gross amount of fæces; of the frequency of defecation and of sensations connected therewith.
		(*d*) Urination	Similar points in relation to urination; clearness of urine; deposits on standing; times of urination; tolerance of the bladder of its contents; its power of retention, &c.
	5. Circulation.		The force, volume, and rate of the radial pulse; its evenness and rhythm; its visibility and equality in the two wrists; proportion of arterial pulsations to the number of inspirations in a given time.
	6. Respiration.		Number of inspirations per minute. Character and mode of respiratory movements as corresponding with or departing from (in certain particulars) the character and mode of healthy breathing; *e. g.*, hurried, catching, shallow, uneven, labored respiration.
	7. Sexual organs.		Regularity, quantity, and color of the catamenial discharge; pain in menstruation; circumstances of arrested, delayed or profuse menstruation; presence of leucorrhœa or other discharge.

While the patient has been engaged in replying to questions, or, where his condition renders this impossible, while his friends have been answering for him, his deportment and posture, the rate and manner of his breathing, his complexion and general aspect, with any changes in these which may occur during the examination, are being carefully noted. This is not only more agreeable to the patient than the plan of first staring at him and afterwards asking him questions; it is also more instructive. The observations made are less fallacious than when the attention of the patient is especially called to the fact that they are being taken; at the same time, the information gained by questioning is not confined to the verbal replies; it includes an estimation of the difficulty or ease with which the individual collects his thoughts, the breathlessness that speaking costs him, or the amount of intelligence or consciousness that he exhibits, while others reply for him. These are so many tests of the condition of the several functions concerned.

The importance of scrutinizing the aspect of a patient can hardly be too much insisted on.—There should be a definite place of pause in the course of every clinical inquiry while the question is inwardly put, What do I learn from this man's face and manner and gait? The point is too much neglected by students, both because they are eager to enter upon those special modes of investigation which seem to belong more properly to scientific medicine, and because at first they do in fact fail to derive much information from the mere physiognomy of disease. Yet it is not too much to say there is hardly an affection of the body which does not lend an expression of its own to the face, if we could but read it, and that we are very imperfectly acquainted with any disease until we can raise in our minds some picture of the look of it.

The posture also is often characteristic, but it is apt to be constrained while the patient is under examination, and is best judged of when he believes himself unobserved.[1]

The patient having now concluded his narrative, it remains, before making actual examination of his body, to question him in some detail upon such special points connected with his animal functions and the habit of his secretions and evacuations as can only be learned from himself. The course which the inquiry now takes, therefore, is to review in succession the present state of the functions of innervation,[2] digestion, circulation, and respiration, partly by direct observation, and partly through the information of the patient, whose replies are now to be limited to these points.

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[1] Examples of a particular posture being assumed are found chiefly, as might be supposed, among chest affections. It is here that changes of position affect most materially the actual working of organs, and compensate the most for their defect. The mechanism being altered, change of posture follows instinctively, so as to meet the new circumstances. The position assumed during the asthmatic paroxysm, the orthopnœa of dilated heart, "the diagonal decubitus" of hydrothorax, the carefully-adjusted constrained posture, different in each case, which best accommodates a thoracic tumor, are so many instances of this; while for the abdomen we notice especially the bent-up knees, designed to reduce to a minimum the movements of the abdominal muscles. It is to be observed, however, that these postures are none of them connected invariably with the diseases in question so as to warrant us in assuming from the absence of the one the absence of the other.

[2] As regards innervation, the more obvious points in relation to it will have come under notice already, both from the patient's history and from the observation of his manner and bearing. We have to judge now, in any particular case, whether the state of

In feeling the skin, the sensation of heat or cold which the hand experiences is only a rough guide to the actual temperature of the surface, and its variations from time to time.—Where accurate observation is necessary, as in the case of fevers and all acute disease, we have recourse to the thermometer. In the simple matter of applying this instrument to the skin, the student must not forget the numerous avenues of fallacy open to him. Thus the thermometer may be removed too soon, or it may not be placed in strict contact with the axilla, or its reading may be taken too late after removal, or the graduation of the instrument may itself be incorrect. It is a notable fact that separate observers on the same case hardly ever obtain precisely the same results.

The evidence of the thermometer cannot stand alone.—It must be supported, especially by that of the pulse and respiration. Further, the actual temperature at a given time, as an isolated fact, is of little value. We must know the period of disease to which it belongs, and connect it with an ascending or descending *scale* of temperatures. It is the nature of the variations which is instructive. These are to be

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this function requires to be tested further by nicer methods. It is here, in fact, that the examination may legitimately fix itself upon one or another of the animal functions, more particularly as containing the clue to the diagnosis. At the same time, these are too intimately connected for any of them to be passed over in this general survey.

traced continuously from day to day, and may be proximately represented (although obviously not without risk of serious error by omission) by the usual plan of taking morning and evening observations,[1] recording the pulse register along with that of the thermometer. It is to be added that the temperature is not the whole matter to be made out in connection with the skin. The impression conveyed to the hand, as of moisture or harshness or pungency, and which the hand alone can appreciate, is often of more value in determining the nature of a disease seen for the first time than the mere register of the thermometer, whose teaching indeed is mainly confined to a certain class of affections.

The temperature refers to the whole body, to the trunk and head, as well as the limbs; it will sometimes be necessary to ascertain, by means of the thermometer, to what extent the bodily heat varies in different parts, and, in paralysis, to note any lowering of temperature of the affected side or limb.

In this place, as a matter of convenience, though not in strict order, the abdomen may be felt and its general contour ascertained; pressure may be made, over its chief regions—here or there, more particularly as the history points—to determine its resilience and the existence of spots of tenderness.—This is best accomplished without exposure of the body, or calling the atte the patient to what is being done. It som happens that a formal examination of the ab will draw forth expressions of acute pain, whi absent so long as the patient's mind is engaged where. Tenderness of this kind is apt in its mislead, while the rigidity of muscle which ac panies it renders manipulation useless. Where nature of the case demands it, the chest and b may be uncovered afterwards, as in search for spots of enteric fever, or the mottling of typhus, for any other eruption.

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[1] In taking temperatures, allowance is always to be made for the rise which takes place with the approach of night. With children (where accuracy of observation as to the state of skin and mucous membranes is of the utmost importance) this rise is often so considerable that a single observation taken in the evening may lead to very erroneous conclusions, unless it be remembered that these patients, even in slight affections, are liable to a sudden accession of heat at that period.

A further and more particular examination of th abdominal organs forms part of the special examination which is to follow ; this much can be done with ease and celerity now, and has its special advantages.

It may or may not be judged necessary to inspect the lower limbs at this stage. Its main object would be the detection of œdema. *A slight amount of œdema about the ankles or insteps, though a symptom of great significance, is very apt to be overlooked.*—Continued forcible pressure, with one finger upon the ankle or shin-bone, renders it evident by the slight pitting which it leaves behind. The commencement of œdematous puffiness about the orbits is best judged of by those who are familiar with the face, the patient himself and his friends.

In the case of infants, the uncovering of the body is always necessary, for the sake of observing the general nutrition and shape and color of the limbs and trunk. The inspection may at once disclose the bent bones and rounded protruding belly of rickets, or shining coppery red patches about the nates and buttocks, which, with sniffling and yellow discharge from the nostrils, is almost certainly indicative of congenital syphilis.

In investigating in their order the more prominent points relating to digestion, it will be found convenient to include some particulars which do not relate exclusively to the digestive process, since they necessarily come under observation in connection with it.—Thus, the oblique direction or tremulousness of the tongue would necessarily come under notice here, although referring to the nervous rather than the digestive system. Similarly the observation of a depraved or excessive appetite, or of a blue line round the gums, though noted here, would have an import apart from the function which we are at the moment investigating. Such phenomena therefore are recorded and laid aside till they can be considered along with other symptoms of their own kindred.

Of the appetite (with which we may conveniently join the degree of thirst and the desire for alcoholic stimulants) it is not enough to note that it is "good" or "bad," since excessive appetite, a well-known feature in certain affections—and perverted appetite, where there is an unnatural craving for certain things, and a distaste for ordinary food, might thus escape detection.[1] Appetite is a symptom which should never be taken upon trust; it is a point in regard to which there is much self-deception, both amongst hypochondriacs and those who delude themselves with false hopes. In all doubtful cases the precise amount and quality of food taken should be accurately measured. Where the excessive use of alcohol is suspected, the patient's own report of the matter is seldom reliable.

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[1] It would seem unnecessary to caution any careful observer against confounding an inability to take food into the stomach, as from mechanical obstruction, or to retain it there, with the want of appetite or desire for food; yet there is often confusion in this respect in the notes of students.

The indications furnished by the tongue are of every degree of value; its inspection may at once direct us to the disease, or it may afford no information whatever in regard to it.[1]—Whilst looking at the tongue the student must have in his mind the while the several diseases which are characterized by a particular state of the organ, as well as the several states of the general system which are apt to be indicated in the same way. There are certain sources of fallacy which beset this part of the examination; the tongue may be imperfectly inspected, or the information it is calculated to afford may be too implicitly relied on.

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[1] Thus the dried-up, stiffened, and fissured tongue, met with in typhoid conditions, is an accurate measure of the stress of the fever, and is carefully watched from day to day, as furnishing an index of the patient's progress. The strawberry tongue in scarlatina is as much to be expected as the rash itself. The stripped, raw, shining tongue of lurid red color, with corresponding lips, points with probability to a similar condition in the more remote portion of the same membrane. A tongue thickly coated over its whole upper surface with a uniform layer of fur, through which, in children, the elongated papillæ peep, is almost necessarily connected with some derangement of the stomach or intestines. Such conditions are all more or less distinctive; they do not speak with certainty, or of themselves establish a diagnosis, but they have a claim to be considered in corroboration or contradiction of other symptoms. Of less value than these is a tongue which is merely furred and otherwise natural. A thin coating at the back of the organ, sometimes permanent through the day, and sometimes disappearing after the first meal, is an habitual condition with some persons, and conveys no information in particular. It is an aberration from health truly, but its range of meaning is so wide that the observation hardly limits the possible solution of the problem before us. When it is said, therefore, that certain forms of disease are characterized by a certain kind of tongue, so that the one always suggests the other, it must be said, also, that the connection is not invariable. Excluding of course affections of the tongue itself, and affections which the tongue shares with the gums and palate (as, for example, certain infantile diseases of the mouth),

The entire organ must be looked at, its edges and tip, as well as the upper surface from the tip to the uvula, and, along with the tongue, the palate and gums must be examined. Some individuals require pressure before they can be got to exhibit the tongue fully, others are so eager to show it, that they may often be recognized at once as hypochondriacal from that circumstance alone. Again, in some nervous diseases and in extreme prostration, the tongue may be very imperfectly under command, so as to be protruded slowly and with much difficulty, or it may be so parched and stiffened that extra exertion is needed to set it in motion. The actual moisture or dryness of the tongue at a particular inspection may depend upon accidental circumstances; the patient may have lately awakened from sleep, or he may have just taken fluid into his mouth; in either case the observation would fail to indicate the real state of the organ.

The tongue is chiefly a guide to the state of the

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no appearance on its part can alone warrant the conclusion that a particular disease is present. This is but a single application of the general truth that no one symptom is to be taken as pathognomonic, a proposition the neglect of which has led to serious error and disappointment in diagnosis.

mucous membrane of the alimentary track which is continuous with it; it follows, therefore, that there will be diseases in which it is not affected, and others where its being so is an accident of the moment unconnected with the condition we are called upon to investigate.

The precise interpretation to be given to certain appearances of the tongue is often determined by reference to the state of the bowels.—The one inquiry, therefore, conveniently follows the other. The points enumerated above under this heading are intended to elicit information as to the present habit and character of this evacuation. Where the fæces are represented as unusual in any respect, their inspection will be necessary when the personal examination is concluded.

In reference to urination the remark applies, that, with the information now gained, the particularity and minuteness of our inquiry must be governed by the general bearing and aspect of the particular case.—The urine itself will be submitted to analysis presently. What we desire now is the patient's account of his sensations while passing it, of its gross amount and appearance, of the frequency and the times of micturition (the necessity habitually during the night to rise and pass water being a significant symptom), and the size and shape of the issuing stream. As regards the bladder and its appendages, we inquire for any pain or tenderness about the loins; whether the patient is easier before or after micturition; whether the urine dribbles involuntarily between the times of passing it, or the contents of the organ appear to him to be discharged imperfectly, and so on.

Thus far the student's common observation has chiefly informed him, and the points touched upon have been within the application of any one, and such as yield to any one who will apply them fairly a certain amount of information, varying of course with the expertness of the individual and the natural power of his scrutiny. We reach now a part of the inquiry which at first conveys little or no information to the inexperienced, or none that is entirely reliable. The estimation of the character of the pulse is of this kind; it comes with practice. No description can teach it, and no modern methods of registering its beats can take the place of the intelligent and educated touch.

The finger must be taught to appreciate the radial pulse by exercise upon well-marked and strongly-contrasted cases selected for that purpose.—The names that have been given to various kinds of pulsation are, of course, unimportant so long as the features which distinguish them can be recognized and identified.[1]

Important characters in the pulse are sometimes overlooked from haste.—A pulse may be distinctly intermittent yet drop no beat during the second or two that the wrist is held; or it may be uneven or slightly irregular, yet not so much of either as to express its character to a touch-and-go observer. The rate, the regularity, the volume, and the force of the pulse are characters which are successively appreciated in the order in which they are here placed, except, perhaps, that a very slight unevenness or disturbance in the rhythm of the pulse (an important sign in cerebral disturbance, especially at an early stage of meningitis) is very apt to escape recognition. Where the full volume and lifting character of the pulse suggests that its beats may be *visible*—a point much insisted on by some—it may yet require a careful inspection of the spot, the wrist being held in different lights, before the pulsation is seen.

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[1] While insisting upon the importance of making the pulse a subject of careful study as affording the nicest test of the general state of the system, it must be added that its information, like that of the tongue, is sometimes wholly negative. It is for this reason no doubt that the two operations of feeling the pulse and inspecting the tongue are apt to degenerate into a meaningless and even ludicrous routine, punctually performed as a habit while the mind is far away.

Besides the differences of pulse, which depend upon age, or sex, or temperament, it is to be remembered that idiosyncrasy in this respect is not rare.

Where the rate of the pulse[1] *has been ascertained, it is easy, without calling the patient's attention to the matter, to note the corresponding number of respirations by merely transferring the hand from the wrist to the chest or epigastrium* (higher or lower according to the sex and age). At the same time, and by the same operation, we learn as well *the mode* in which respiration is performed, and the share taken in it by the abdominal and thoracic muscles respectively. Where the circumstances of the case demand it, a further and more particular examination of the thorax will follow by and by; but the general character of the breathing, whether labored or catching, or irregular, and the amount of ease or difficulty of completeness, or defect, with which the aeration of the blood is accomplished, are all points to be noticed now, the student having steadily in his mind the while the normal characters of healthy respiratory movement for a man, a woman, or a child.

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[1] Perhaps the commonest, and certainly the earliest, error with reference to the pulse is that of regarding *its rate alone*, to the neglect of its other characters. A quick pulse denotes fever, a slow pulse denotes cerebral disease. The fallacy of this view of the matter may be easily exposed beforehand by reference to the necessities of the circulation in certain circumstances, but for the present purpose it is corrected best in the way I have suggested above; viz., by the comparison of strongly contrasted pulses in different cases selected by the teacher.

There is a manifest propriety in noting these phenomena of circulation and respiration late in the interview, and when the patient is silent and composed.—Even now the possibility that mental agitation may interfere must not be lost sight of. In acute cases, and in those immediately affecting the thoracic organs, it is proper during one visit to make two distinct observations of these functions at such times as the aspect and demeanor of the individual may indicate as most suitable.

V.

SPECIAL EXAMINATION OF THE NERVOUS SYSTEM AS EXHIBITED IN THE PHENOMENA OF MIND, SENSATION, AND MOVEMENT.

Mental Condition.	The frame of mind. The existence and character of delusion; or delirium; of coma Defects in speech, difficult utterance, the misuse, or transposition, or forgetfulness of words.
Common Sensibility	Exalted sensibility, or the reverse; sensations of tingling or numbness, or of formication, &c.
Motility.	The symmetry of the two sides of the face, and direction of the protruded tongue; the equality, or otherwise of the pupils, and their action under stimulus of light; the condition of palsied muscles as to their nutrition, rigidity, temperature, irritability. The presence and character of spasm, convulsion, choreic twitching, tremor; the gait.
Special Sensibility.	Alterations in the special senses; more especially as to *vision*, intolerance of light, double or partial, or miscolored, or ill-defined sight; as to *hearing*, deafness or its reverse; tinnitus aurium; as to *smelling and tasting*, any perversion or defect of those senses.

To whatever category of diseases the symptoms may point, it will be necessary to determine by a further and more particular inquiry, to what extent and in what manner the several organs of the body are implicated. In the light of the knowledge already gained this regional examination may safely be arranged to correspond with the three great cavities—the head, the thorax, the abdomen, that region being explored first in each case which from the symptoms would appear to be chiefly concerned[1] in the production of the symptoms. As to the first division, the brain and cord are not accessible to the same direct method of examination as the other organs; they are out of reach, and must be judged of mainly through the phenomena of mind, sensation, and motion, upon a plan somewhat different from that pursued where the parts concerned are within reach of manipulation. It will happen in many instances that there is no need to linger over this part of the subject; the points already touched upon in the general review of the functions may have sufficed to show that the case in hand is not directly connected with the nervous system; we pass on then to the other regions, to the examination of the physical condition of the organs of the chest and abdomen.

The direct examination with the eye and with the hand of the bony case in which the nerve-centres are shut up, though not mentioned in the table, is in infancy a necessary preliminary to the investigation of the nervous functions. Excluding spinal deformity, which does not belong to the physician, and congenital malformation of the skull, which is hardly to be classed among diseases, this direct examination is chiefly instructive at that period of life when the bones of the skull are not consolidated. Great heat of head, tension and pulsation of the exposed parts of the brain, are important symptoms. Arrest in the process of closure of the fontanelles is not less instructive. The sutures may remain unclosed, or even widen, the skull bones being pushed out so as to impart a globular shape to the child's head. At length comes the fully-developed hydrocephalic head, with eyes displaced and rolling, and the skin of the scalp tightly stretched, as though by it the bones were kept from falling asunder. The extreme condition can neither be overlooked nor misunderstood, but the commencement of this enlargement, the altered shape of the anterior fontanelle from widening of the sutures leading to it, may easily pass unnoticed, as it may indeed precede any obvious change in the shape or size of the child's head.

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[1] It is not meant, of course, that in thus viewing the organs in three separate divisions, we are to consider one portion of the body isolated from the rest. No one region can be fully surveyed without reference to functions which extend beyond it. The examination of the thorax must include the general circulation, the state of the abdomen may need to be explained by the state of the heart, and so on. It is only possible, indeed, to pursue this regional method with advantage when the history and general symptoms of the patient are known.

The mental condition of the patient exhibits itself as the examination proceeds. From the general character of the symptoms it may be evident from the first that there is no need of any special inquiry under this head. It is to be mentioned at the same time that the habitual frame of mind is always a noteworthy feature. Excluding affections of the brain itself, there are some chronic diseases so often attended with a fixed melancholy and hopelessness that the mere aspect of the patient is enough to suggest them. Diabetes is thus seen sometimes through the face. Granular degeneration of the kidney may be accompanied by deep mental depression and frequent tears, while the mental capacity is in no way impaired, and the nervous system as yet untouched. On the other hand, there is the volubility and emphasis of one form of dyspepsia, the hopefulness of phthisis, and the exaltation and grand notions which signalize so remarkably general paresis.

In drawing conclusions from the patient's manner and mode of address, we must seek assistance from those that know him. Neither a strange manner nor a halting gait, nor imperfect articulation, can teach us anything, until we learn whether these peculiarities are habitual or coincident with the illness. The remark may seem too obvious, yet it has happened that natural eccentricity, or a congenital squint, has been accepted without inquiry as part of the evidence in favor of cerebral disturbance.

Should delirium be present, that symptom deserves the most attentive study. In investigating it we have to determine especially the fixedness or hold which it has obtained, whether or not it can be broken in upon by the presence or words of another. Thus, in the ordinary delirium of fever, the patient, although burdened with fancies when left to himself, is rational and coherent when aroused by questions. Delirium of this kind, increasing towards night, and mixing with the muttering half-sleep of the patient, is amongst the train of symptoms proper to the febrile state. With an equal stress of fever, the exact degree of this wandering is known to vary accord-

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ing to the temperament of the individual. Quite different from this condition, and sometimes suddenly taking its place, is that acute delirium where the patient is wild and terrified, and no soothing can pacify him or hold him in bed. This latter symptom occurring early, and before the other features of fever have been recognized, is often misinterpreted. It may be taken for inflammation within the brain, or for acute delirious mania, or (when the history is one of alcoholic excess) for delirium tremens; its real meaning may not be discernible at once, or until other symptoms have arisen to be considered by the side of it.

Short of actual delirium there is the apathy and blunted perception which belongs particularly to continued fever, and affords one of its most valuable diagnostic signs.—In such cases deafness, or altered perception of taste or color may give rise to erroneous impressions, on the part of the patient, and be mistaken by a careless observer for mental wanderings.

When the condition is that of coma, we have to estimate the degree of insensibility by the application of various tests, as by touching the conjunctiva with the finger to provoke winking, or by tickling the soles of the feet to elicit some responsive movement on the part of the limb or the facial muscles. We judge further of the depth of insensibility by the countenance, by the sound of the respiration and the movement of the cheeks therewith. The coma of drunkenness, a condition of itself absolutely undistinguishable from other coma, may in practice be guessed at by the attending circumstances with great probability of success.

When the coma is profound, evidence of palsy is always to be sought for.—The well-known expedient of raising the arms alternately, and comparing their manner of falling and their attitude when dropped, does not always determine the question. Under such circumstances the muscles of the face will sometimes, by their loss of symmetry, indicate palsy of one side.

Between the condition of utter unconsciousness and the partial or incomplete coma to which the name of stupor has been applied, there are many definable degrees of consciousness and sensibility. In any case, a patient is not to be assumed as unconscious because he fails to make any response, by word or gesture, to our expedients for eliciting some outward sign of his consciousness.

Nearly associated with paralysis, and in fact often a part of it, are various modifications in the mode of speech.—What has to be determined in reference to defective speech is the share that belongs to the impaired mind and the share that belongs to the palsied muscles. Students are perhaps too ready to regard imperfections in speech as indicative of cerebral disease. The mode of utterance rendered necessary by partial paralysis of the tongue and larynx closely resembles that which results from alcoholic intoxication. Hesitancy or thickness of utterance, inability to frame immediate answers, misuse or forgetfulness of words, important symptoms, all of them in nervous disease, are also not uncommon as the results of defective speech-mechanism, or of native stupidity or mere habit. It is here, therefore, especially necessary that impressions derived from these sources should be very carefully investigated, and that the friends should be consulted as to the patient's ordinary manner of speech.

Such phenomena of common sensibility as are mainly subjective — the sensations, that is, experienced by the patient — tingling or numbness, or oversensitiveness to touch, have been detailed already in the course of the personal narrative. It remains now to determine, by the application of special tests, whether or not such symptoms are associated with actual impairment of sensibility to outward impressions. Thus, by pinching or pricking or tickling the extremities and the soles of the feet, we ascertain whether sensation is exalted or diminished, or absent, or unequal for the two sides of the body. With greater nicety we may measure the accuracy of the patient's impressions by the successive application to the feet and legs of the compass points less and less separated until, at a certain distance apart, he no longer distinguishes the two, the sensation becoming that of a single point's contact.

It may happen in this place that an inquiry openly in regard to that question encounters for the first time a high degree of tenderness, which did not exist when the same regions were informally examined, with the patient's thoughts engaged elsewhere.—Such an occurrence in women is strong evidence of hysteria. At the same time, I believe that in these days the symptom of hyperaesthesia is far too commonly ascribed to that cause, and that by the too easy way in which we make use of this mere phrase hysteria, to explain difficult symptoms, the most real affections are sometimes overlooked.

The power of movement may be affected in many ways, some obvious to the sight at once, and some discoverable only after certain tests have been applied.—Thus, the motor power may be weakened or lost, or it may be removed from the control of the will by the interference of involuntary spasmodic movements, or the nervous control may be so imperfect or so unequal that the combined movements necessary for certain acts, as walking or speaking, are ill harmonized, so that the gait becomes halting and clumsy, and the speech thick and difficult.

When the muscles of the face are affected, it may be necessary, in order to ascertain the precise character and extent of the paralysis—a point, of course, of the highest importance—to direct the patient to attempt various facial movements designed to bring into play the several groups of muscles, as sniffing, pursing the lips to whistle, shutting the eyes tight. It is to be remembered, however, that exact symmetry of the face and exact straightness of the protruded tongue are not always to be met with, even in persons who are nevertheless unparalyzed. Scrupulous accuracy may here defeat its own object. We have again to seek aid from the friends of the patient, or from himself, before drawing conclusions.

It sometimes happens that an alteration in the set of the features not sufficient as yet to give an expression of vacancy to the face, nor of itself to engage the attention of an ordinary observer, is among the first symptoms to excite uneasiness in the patient's family.

In paralysis beyond the face the size of the palsied limb is to be compared with that of the opposite side, or, when both sides are palsied, the nutrition of their muscles with the general nutrition of the body. By flexure of the limb, it is ascertained whether the condition is one of rigid or of lax paralysis, and by inspection the wasting may be found to be general or confined to certain muscles. This partial wasting is of special significance where the ball of the thumb or the deltoid muscle is first affected. The temperature of the palsied limb is contrasted with that of the sound limb, care being taken that both have been under the same conditions as to their external covering for some time previously to the observation. The proneness to reflex movement may be ascertained, and the state of muscular irritability tested, by percussion and electricity.[1]

We have to include, under the heading MOTILITY, *not*

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[1] Diseases of the nervous system are proverbially obscure. They may be purely subjective as to their symptoms, offering to our scrutiny no sign whatever save the sensations described by the patients, or they may exhibit under certain circumstances phenomena of their own which it yet requires some skill and address to elicit. The affections of the paralytic kind present the following points for determination. First, is the lesion centric or eccentric, the fault of the nerve-centres or the fault of the nerves? If the former, what character of brain-injury would best correspond with the particular form of paralysis presented; if the latter, what are the distribution and connections of the nerves which supply the affected muscles? It is clearly vain to undertake any such investigation without an intimate knowledge of the anatomy and physiology of the nervous system. With that knowledge should be joined, of course, an acquaintance with such phenomena of altered sensation and motion as have been hitherto observed in connection with definite lesions of the brain and cord. This much is the material to start with. Any further assistance of the tabular

only the loss of motion, but various peculiarities of movement, which indicate that the motor power is impaired or altered.—In this place, therefore, tetanic spasm, the twitchings of chorea, tremors, the cautious muscular movements of general paresis (including its halting stumbling articulation), inability to co-ordinate the movements, and so on, come for consideration. These points, noticed already in the earlier part of the patient's examination, may require further elucidation now by his performance of certain special acts. It may be necessary to bid the patient move about the room, so as to observe his gait. The tardier drawing forward of the limb of one side, its obvious dragging with the walk, easily distinguishes imperfect hemiplegia. It is to be noticed, however, that in such cases there yet remains the power both ot moving the leg forward and of lifting it from the ground; in walking, both these actions are somewhat slower and more laborious than natural, but both are performed. In hysterical hemiplegia, on the contrary, the leg is often dragged along, as if dead, no attempt being made to lift it.

There are besides many peculiarities of gait characteristic of different forms of disease, from that which at first sight amounts to no more than mere

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kind designed to solve the question at a glance is delusive and misleading. Each case must be fairly worked out on its own merits, with the introduction of more considerations than can find admission into a table. In the brain with so close a neighborhood of distinct parts separate as to function, yet apt to suffer in common, the symptoms proper to disease of any single part are continually complicated and obscured by the involvement of contiguous parts. Separate centres, presiding over quite different functions, are yet exposed to the same sources of injury, and share in a common ruin.

awkwardness, or want of nimbleness; to the unsteady reeling and tumbling, where the eyes follow and assist the movements of the legs, and each step is matter of calculation. It does not suffice therefore to describe the manner of walking in general terms as "unsteady," or "uncertain," or "reeling;" its exact character must be defined. Are the feet thrown outwards as well as forwards? Does the patient tread with the soles or the heels? Do the feet wander in search of a landing, as not knowing where to find the ground? How is the difficulty of progressing affected when his eyes are covered? Finally, when the patient is again seated, what remains of his infirmity. Does it appear that this stumbling is attributable to mere want of power in the muscles of his legs, as distinct from his inability to co-ordinate their movements?

Alterations in the special senses, due to a change in the physical condition or mechanism of the special organ, may arise in the course of many diseases not primarily connected with the nervous system. The yellow coloring of objects in some cases of jaundice, the otorrhœa of diseased temporal bone, inequality of the pupils from pressure upon the sympathetic, in some instances of intrathoracic tumor, are so many observed examples of symptoms connected with the special senses, and pointing to disease away from the nervous system. Both deafness and its reverse, acute sensibility to slight sounds, are frequent accompaniments of fever, floating specks before the eyes, and perverted taste are amongst the thousand symptoms complained of in dyspepsia, while defective sight from opacity of the retina in albuminuria often anticipates the other nervous lesions of that disease.

VI.

THE CONDITION OF THE ORGANS AND VESSELS OF THE THORAX SO FAR AS THESE APPEAR UPON INSPECTION AND HANDLING.

Inspection. . .	Character of the dyspnœa. " of the sputa. " of the cough. The shape of the chest and its movement in respiration. Ratio of the pulse to the respiration. The site of the heart's visible impulse. The site and character of other visible pulsation.
Palpation. . .	The character of the heart's impulse. The presence or absence of vocal or other fremitus. The detection of fluid by "fluctuation" or "succession," or of spots of tenderness.

The mere inspection of the chest may serve to explain or correct or qualify the statements made by the patient in the course of his narrative. Apart from any account or complaint of his, we have now to form our own independent estimate as to the actual rate and freedom and adequacy of the respiratory movements. It may happen that difficulty in breathing or shortness of breath has been complained of. We have to determine the exact manner in which that symptom presents itself; how far, that is, it resides in the sensations of the patient, and how far it is to be accounted for on purely physical grounds.

The term dyspnœa, like many other technical words in medicine, is not always understood in the same way.—There may exist the most distressing SENSE of want of breath, as in hysteria, and sometimes in anæmia, when to all appearance the function of respiration is quite undisturbed; and there may be very rapid breathing, quite ineffectual to aerate the blood, and yet the *feeling* of dyspnœa may be absent. Dyspnœa, then, understood as referring to the sensations of the patient, is no measure of the actual performance of the respiratory apparatus. It will be more or less urgent according to the nervous susceptibilities of the individual, and is often complained of where no structural disease can be discovered. It is important that this should be kept in mind, so as to avoid any hasty conclusion, that the complaint of breathlessness necessarily implies disease of the respiratory organs. A large number of the patients who present themselves at hospitals, *complaining of dyspnœa alone*, have no affection of the chest at all, and of the rest it is more common to find the symptom in connection with heart-affections than with those which belong primarily to the lungs. Hurried breathing, with or without the sense of dyspnœa, is of course present in most cases of thoracic disease, but it is not confined to these, nor proportioned to their extent.

The degree of the patient's distress for breath depends indeed much more upon the rate of progress of the disease than upon the advance which this has actually *made.*—In accordance with this rule, a patient suddenly deprived—say by pneumonia—of the use of a very small part of one lung will suffer the most urgent dyspnœa, while another with his whole lung made useless by slow compression will be hardly conscious of short breath. In many diseases of long standing and slow progress—as in emphysema—quickened respiration becomes sometimes so far habitual as to give rise to no noticeable distress; the breathing does not improve; it is no better done than before; but dyspnœa, in the ordinary sense of it, disappears. It is well, therefore, to dissociate the symptom dyspnœa, which is often entirely subjective, from the actual observation of the rate and character of the respiration, which is a positive fact.

In those cases where the general symptoms have already informed us that the chest organs at least share in the general disorder, it is well as a preliminary to the systematic inspection of the breathing process to take the evidence of the expectoration and cough.

The information furnished by the sputa is to be regarded only as corroborative.—In young children we are deprived of this sign, and in adults we are sometimes misled by it. Thus in hæmoptysis we may be mistaken as to the source of the bleeding from the blood being first swallowed and then rejected by vomiting; while, on the other hand, hæmatemesis, by provoking cough rather than retching, may simulate bleeding from the chest. In women it is often especially difficult to estimate the significance of both these symptoms, and the possibility of the hemorrhage being vicarious menstruation has always to be carefully weighed.

In the inspection of the expectoration it is to be observed that the blood-streaked sputa often occurring in phthisis and obstructive disease of the valves of the heart (and not unknown as the direct result of violent coughing without disease either of the heart or lungs), is not the same nor of the same import with the intimate admixture of blood and mucus which distinguishes the true "rusty" sputa.

The particular color of the expectoration has given rise to names and similes with which the student will be familiar from the book descriptions. I would only remind him that such coloring is to be closely scrutinized before it is named. It is sometimes due to the port wine, or coffee, or steel mixture, which the patient is taking at the time; it may be difficult or even impossible to determine by mere inspection whether slight discoloration is so caused or not.[1]

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[1] It would be incorrect to represent the ordinary course of investigation as including a microscopic examination of the sputum. The chief, though not the only value, of the microscope in this place is for the discovery in the sputa of fragments of lung-tissue in cases where there is reason to suspect the disintegration of lung but no auscultating sign to positively indicate it. Instances of phthisis have occurred, indeed, where the appearance of such fragments has preceded all other symptoms. It is only necessary to observe here, that while the lung-tissue itself has a very distinctive appearance, which can hardly be mistaken by those who have once seen it, the sputa are apt to entangle a quantity of added material, as epithelium, yellow fibrous tissue, fragments of muscular fibres, and the like, which are quite capable of misleading a hasty observer.

It is easy to conceive other instances where the use of the microscope will be essential for the clearing up of doubtful points; as

The adhesiveness or wateriness of the expectoration, its weight and consistence, its quantity in a given time, its combining to form a uniform jelly or remaining in distinct masses, its admixture of pus, and its smell, are equally points to be carefully noted as indicating the source and meaning of the secretion.

It is not the expectoration alone, as seen in the porringer, that we may judge by; the effort which it has cost the patient to produce it, and the time of the day when it is most abundant, are further material facts. *Directly connected therefore with this part of the subject is the observation of the character and time of the cough.*—The bare fact that cough is alleged goes, of course, for nothing; we have to hear the ring of it, and learn the periods of its occurrence, and the causes which appear to excite it. Thus, for example, the elicited fact that cough attacks the patient on first rising, and continues in paroxysms until a certain quantity of expectoration is produced, points at once to a particular class of affections, while the contrary statement that cough not paroxysmal occurs later in the day, goes far to exclude that particular class, and suggests that such cough may be wholly unconnected with any chest affection. "Cough," it is true, is often set down in notes as a symptom, and there left, yet we all know that enlarged tonsils, elongated uvula, mere nervous habit, dyspepsia, the voluntary smothering of flatulence, and many other things will equally suffice to pro-

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malignant deposit, communication with hepatic abscess or hydatid cyst through the diaphragm, &c. What I would oppose is the view that the microscope can inform us as to the nature or progress of lung disease in general.

duce it. At the same time this symptom, often so pointless, is the single objective phenomenon to characterize hooping cough, is a valuable sign in croup, and sometimes in laryngitis or thoracic aneurism. Many other varieties of cough are apt to be distinctive, as that of emphysema, of bronchorrhœa, and of the later stages of phthisis; yet in these diseases the information thus afforded is superfluous for diagnostic purposes, since the diagnosis is already secure without it.

For the actual inspection of the shape and movements of the chest the patient must be naked to the waist, or clothed only with a single thin covering.—The inspection to be useful should be prolonged and systematic;[1] the eye does not at once perceive slight inequalities of movement, nor indeed, with perfectly tranquil breathing, recognize immediately in all cases the fact that movement is going on. Where it is practicable, the patient should be inspected both in the sitting and standing postures, and from several points of view. The observer having distinctly in his mind the method and order of movement in healthy breathing, measures with his eye the lateral expansion of the ribs with inspiration, the elevation and expansion of the upper part of the chest, and the fulness and completeness of the inspiratory act, or else its abrupt and jerking termination. He notes at the same time the share in respiration taken by the abdomen, and the degree in which the breathing is obviously accelerated or altered in character by its being observed. At first, the chest movements have to be observed generally. Afterwards, when the eye has taken in that much, it proceeds to a careful comparison of the two sides. It is wonderful how much may be made out, and to what extent the further inquiry may be directed by a careful deliberate inspection of this kind. Along with it it may be possible with thin patients to observe the position and something of the character of the heart's visible impulse, its regularity, and rate, and evenness, as well as to detect pulsation elsewhere, or the bulging of one or more ribs, or the obliteration or prominence of an intercostal space, or the marks of old wounds.

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[1] A hasty or partial examination of the chest is worse than useless. It must be seen fully, and examined throughout by all the methods. It is not uncommon to see the operation performed in a manner which, however it may affect the patient, is ridiculously incomplete. A small part of one side of the chest is exposed by the patient pulling open some portion of his clothing. Into this aperture the stethoscope is thrust and the practitioner assumes the attitude and aspect of listening as for some actual message which is to reach his ear from the assumed seat of the disease. But the stethoscope does not yield information in this sense; to such a listener, however he may conceal the fact, we may be sure that it says nothing. Unless the examination can be thorough, with the thing to be examined fairly in view, and each sign corroborated by the others, it is far better and honester to omit it altogether. Truer results are arrived at without it by trusting entirely to the more general symptoms.

Before drawing conclusions from this inspection we must of course ascertain that the altered shape or movements are not due to deformities of the spine or ribs, as from curvature or anchylosis or congenital malformation. Short of actual deformity, the student must be prepared to make allowance for the modified movements of ill-developed chests, which depart more or less from the typical shape. Thus there is the shallow and long chest with the shoulder-blades sticking out like wings (*the pterygoid chest*), and ribs more or less flattened anteriorly; and the *pi breast*, with the stomach advanced and the true straightened out on either side, and the *thorax formed by rickets* where the true ribs have beco bent inwards from pressure from without.[1]

Examination by the hand (which is not intended include percussion) is so far in advance of that by th eye, as it affords information of disease which as yet ha produced no visible change.—It enables us also in those cases where inspection has already revealed some defect, to take a further step towards determining its nature. Thus, by the application of the hand we may estimate the force and area of the cardiac impulse, compare the vibration of the voice in the lungs of the two sides, and in some conditions, by a simple manœuvre, detect the presence of fluid within the chest. Let it be remembered that *the precise spot of greatest cardiac impulse varies with the posture;* that inspiration not only depresses it slightly, but, by interposing a portion of lung, weakens its force. Expiration, on the contrary, and all those conditions of the abdomen which push up the diaphragm, must tend both to raise the apex-beat and to carry it to the left. Fallacious conclusions as to the heart's size from this test may easily arise in many ways. The entire organ, apex and all, may have been pushed or pulled out of its place. Pleural fluid on the left side will push the heart to the right and upwards till its apex approaches the apex of the right lung. On the contrary, rapid absorption of such fluid, with retraction, will pull it towards its own side. Emphysematous lung will cause displacement downwards, and may interpose between the hand and the heart so as to deaden the force of the impulse. An enlarged heart may have a very feeble impulse from muscular degeneration; one of natural size may exhibit a peculiar thumping action in persons of excitable temperament. The shape of chest and depth of muscle, the age, and sex have likewise to be considered. Hence the several kinds of impulse set down in the books as due to hypertrophy, to hypertrophy with dilatation, to simple dilatation, to a heart beating in fluid, and so on, are subject to modification in real practice from a number of circumstances, the neglect of which leads sometimes to the most surprising errors. These arise in great measure from conclusions being too hastily arrived at. It is the course of prudence (supposing the heart's state to be mainly in question), after obtaining from this method by the hand whatever information it can afford—as of heaving, or flapping, or undulating impulse, of extended area of impulse, or what not—to pass on (simply registering the impression for further use) to percussion and auscultation. In physical diagnosis there are usually several signs bearing upon a single point. We take them in their order. The apparent meaning of any one may be materially changed when considered in relation to those that follow. The actual signification of each can only be finally determined when the whole have been arranged and harmonized.

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[1] On the changes in shape which the thorax undergoes, and indeed upon the physics of the chest generally, the student will do well to consult carefully the valuable little work of Dr. Gee upon "Auscultation and Percussion, and other Methods of Physical Examination of the Chest."

The hand conveys information of the physical state of the lungs, with less probability of error than for the heart, yet here it is not an infallible guide. *Vocal fremitus*, or the thrill which is felt by the hand placed lightly upon the chest while the patient speaks, is a phenomenon easily appreciated, and serving sometimes to determine a doubtful diagnosis. *It is of value, however, only as a comparative sign.* There is no such thing as a standard of healthy vibration, nor can we always estimate the numerous circumstances which occur to modify the degree of vibration in different cases. The manner of applying the hand is not unimportant. By too forcible pressure the fremitus of the voice may be deadened or wholly lost.

Let it be remembered that *nothing can be inferred from the uniform absence of fremitus;* that as a rule it is not found in women or children, and is apt to vary directly with the loudness and bass tone of the voice. In healthy people who have it, it is usually more intense on the right side. Though a sign of great value in helping to distinguish the dulness of increased density of lung from the dulness of fluid accumulation in the pleural cavity—a distinction which circumstances sometimes combine to render obscure—vocal vibration is not entirely reliable for that purpose. In rare instances, for reasons which can only be conjectured, the presence of fluid does *not* annul the vocal fremitus; while, as has been said, it may be absent in some individuals under all circumstances whatever. It appears, therefore, that this sign is inapplicable in a certain class of cases, and that in a few it would of itself be misleading. Its chief use is as a corroborative test, and it is one very readily applied.

As with the heart and breath sounds, so here the general character of vocal vibration in different subjects, and the varying degrees of it proper to different parts of the same chest, may be made familiar beforehand by exercise upon healthy persons, with voices of various pitch—men, women, and children.

Besides vocal fremitus, the books speak of "tussive" and "rhonchal" fremitus, terms which explain themselves. Further, *the sensation of rubbing membranes which the hand sometimes detects in pleurisy, and rarely in pericarditis*, has been called "friction fremitus." Of these terms it may be said that the first and second are of no interest whatever, while palpable rubbing,—the so-called friction fremitus,—is a mere curiosity of no practical value, revealing only what can be learned otherwise.

The production by the fingers of "fluctuation" within the cavity of the chest, or its occurrence with the act of respiration, serves mostly to demonstrate what is made obvious by other signs,—viz., the existence of fluid within a cavity of certain dimensions. Here, again, various names have been devised for the different expedients by means of which the phenomenon is elicited. Where the fluid collection is sufficient to cause bulging and widening of the intercostal spaces, the evidence of fluctuation may be got by the same method of procedure as is applied to fluid in the belly; where it is smaller, by applying the fingers, as in the detection of abscess. These methods, familiarly known under the names of medical and surgical fluctuation, are not applicable where the cavity is not raised above the surface, but partially protected by the covering of the ribs. This condition demands a slight modification of the ordinary plan. The tips of one or two fingers placed firmly over such a spot while short sharp taps are given close to it with the forefinger of the other hand, will sometimes be made sensible at the moment of the stroke of the undulation of fluid beneath.

When air as well as fluid is present, that condition is made known by the simple expedient of jolting the patient. "Succussion" is, in fact, only an expression used to denote the audible splash which results under such circumstances from shaking,—shaking, that is, with sufficient violence and sharpness where the cavity is of some size. The objection to the employment of such rough measures is obvious, the more so since the condition to which it applies may generally be recognized without having recourse to them. All the varieties of fluctuation indeed, "simple" and "peripheric" and "rhonchal," and "by succussion," are rendered for the most part superfluous, so far as the chest is concerned, by reason of the nicer and gentler methods furnished by auscultation and percussion.[1]

During the application of the hand, and still more during percussion of the chest, the existence of spots of tenderness may come under notice, and require careful investigation. It happens sometimes that patients have an instinctive dread of the slightest pressure or manipulation over a particular spot of the anterior chest. The stethoscope, applied ever so lightly, may give rise to faintness or even distinct shivering. Such sensations are sometimes explained by the existence of aneurism, or of affections of the bony parts of the chest; sometimes they remain unexplained.

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[1] It is not improper to observe, in reference to the resort to violence in physical examinations, that in addition to the annoyance and possible pain of it, the patient is apt to feel a distrust of the efficacy of such rough usage, and of the skill of him who applies it. It is quite legitimate to take pains to escape such suspicion, though never, of course, at the risk of overlooking any feature of the case.

VII.

THE CONDITION OF THE CHEST SO FAR AS THIS IS DETERMINED BY THE VARIOUS SIGNS IT YIELDS ON PERCUSSION, VIZ.: THE BOUNDARIES OF THE LUNGS, THEIR DENSITY IN VARIOUS PARTS, THE POSITION AND SIZE OF SOLID OR FLUID DEPOSITS OR OF HOLLOW CAVITIES, THE SPACE OCCUPIED BY THE HEART OR ITS APPENDAGES, AND BY THE GREAT VESSELS.

Percussion. . .

The area of lung resonance; the variations of percussion-note or resistance over the chief regions of the chest, and the correspondence or otherwise of the two sides of the chest.

The anterior resonance.—Comparison of the infra-clavicular spaces; mapping out by percussion the size and situation of the heart and great vessels, and of intrathoracic tumors extended or diminished or misplaced cardiac dulness referred to its probable cause (*e. g.*, abnormal size, intrusion of fluid or of lung-tissue, displacement, &c.).

The posterior resonance.—Comparative lung resonance above the scapular spines.

Comparative lung resonance *and percussion resistance* below the scapular spines.

Defining the character of altered percussion-note and altered percussion resistance; e.g., lessened resonance; superficial resonance with deep dulness; dulness in its degrees (with corresponding varieties in resistance); tympany, metallic note, &c.

The methods of examination hitherto mentioned may be readily applied by any one who has eyes and hands, and will yield more or less instruction according to the knowledge possessed of the normal condition and properties of the organs concerned. The methods which are to follow can only be acquired by degrees, and demand a special education of the fingers and of the hearing sense.

The art of percussing the chest should be got by practice upon a healthy person, a youth or young man of good build, over the surface of whose body is to be mapped out, by aid of the sounds elicited, the position occupied by the principal organs. By such exercise the student is to determine the size and position of the heart, the limits of the lungs, and the space taken up by the liver and by the stomach. This is to be done not only to his own satisfaction, but distinctly enough for the bystanders to recognize the differences in tone over various parts. He may further endeavor to detect and to make obvious to others the altered area of resonance after a full inspiration and after a full expiration, and, for the heart, to make out the spot of dulness due to its immediate contact with the chest-wall, and the margins of less dulness on either side where the edges of the lungs interpose. The test of success must always be that by every stroke of his he should convey to the ears of others a correct notion of the part which is being percussed.

When first called upon to undertake a task of this kind, most students in their extremity, and calling to mind how on occasion they have used percussion with hammer or knuckles to ascertain the thickness of walls or the fulness of casks, will have recourse to a similar plan in the case of the chest, striking it directly with the fingers of one hand, without using the other. So, indeed, in the first instance did the great author of auscultation himself. I think it is well that this mode should be used at first by any one who prefers it as the easier. It shows at once that there *are* varieties of sound in the chest, that percussion in any hands must be of use more or less, and it shows in time that the points to be determined are but roughly made out without the aid of a pleximeter. Thus the operator comes to use the finger of the other hand, not because that is the common practice, but from the discovery that its assistance is needed.

At the outset it may be some aid to observe for awhile the mode in which mediate percussion is practiced by those who have long made use of it. There are, indeed, as the student will not fail to notice, many different modes of performing this simple act, all of which it is to be supposed are satisfactory to those who employ them. It will be seen, too, that the amount of information conveyed to the listeners by these several methods is as various as the methods themselves. There seems, in fact, to be one best way of percussing the chest, which some attain and some miss, and which anyhow is not to be learned from discussion or the reading of books.[1]

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[1] Percussion sounds are spoken of under many names, and the terms, "note," and "tone," and "pitch," and "quality" of sound are so many expressions serving rather to confuse than instruct. It seems best to describe the sounds of the chest (the *sounds elicited* as distinct from the *sounds heard* by auscultation) in terms supplied

Where it is feasible, the best posture for a patient to assume during percussion is either standing or

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by the body itself. Such is the nomenclature which we should naturally adopt if percussion were first learned, as I venture to recommend it should be, by practice upon the healthy subject. Thus so soon as we recognize the sound yielded by healthy lung, we distinguish it by a name derived from itself. It is a "pulmonary" sound, and it is nothing else. No effort of writing can or need describe it, nor can we fix in the mind a certain tone or note as being the sound proper for all cases. Yet with all its modifications it retains a character which is shared by all healthy lung-structure. This pulmonary sound or note being once recognized, its particular character or pitch is of consequence only comparatively. *In itself it is hardly of consequence at all.* In the comparison of the two lungs one with the other, or of different parts of the same lung, we require to be keenly appreciative of slight differences of tone. In seeking to express such differences, the word "*resonant*" may be conveniently used, in its degrees of more or less, to define the comparative character of the pulmonary note. For other words, though the sounds intended have little that is distinctive, it may be found convenient to speak of the stomach's note to denote the hollow sound elicited, sometimes in percussing that organ, or, in a similar sense, of "liver dulness" or of "heart dulness," the difference between the two latter being *not one of sound but of resistance to the stroke.* As distinct from the pulmonary note, and implying its total absence, we have, on the two sides of it, (1) hollowness, a quite distinctive, drum-like sound, justifying the word "*tympanitic;*" and (2) that deadness of sound to which, inappropriately enough, the word "*dulness*" has been given. These sounds again, have their modifications. There is a peculiar intensity of dulness (so to speak) where a collection of fluid is percussed, and there is a particular variety of tympany produced sometimes by striking over a large superficial cavity. Such sounds may deserve special names. It is best, however, that sounds of particular character—some of them common enough and some mere curiosities—should be heard before they are christened. The expressions "wooden," and "amphoric," and "cracked-pot," and "metallic," and the like, apt as some of them are, must always remain the exclusive property of those who recognize the resemblances which these words imply.

sitting; the recumbent position and stooping forwards may be necessary afterwards for the elucidation of certain special points. *Where the patient's condition forbids much movement, it is important carefully to adjust his position so that, whether wholly or entirely recumbent, he may at least lie even, with the two shoulders on the same level.* Without attention to posture, nothing can be gathered from the sounds. Nor can anything be learned unless the chest is freely uncovered. To seek information by striking one part of it, while the rest is out of reach, is a perfectly useless process. Another obvious precaution is to clear the neighborhood of the patient of bed-hangings and loose overclothes. Yet percussion is sometimes attempted without regard to any of these matters, and under circumstances which render its performance simply impossible.

For percussion of the back, as for its auscultation, it is almost essential that the patient should either sit or stand; the best position is bending forwards with the arms crossed, so that the elbows may meet, or nearly meet. The lateral regions are conveniently exposed when the patient's hands are clasped upon his head. With all the assistance that posture can lend, it is sometimes difficult or even impossible to elicit the pulmonary sounds in fat subjects. In such cases forcible percussion (distinguishable from hard knocking) becomes necessary. With infants, where the employment of percussion is of the highest importance, from the absence in them of some other physical indications, the patience may be tried by the difficulty of getting the chest into position, but the operation itself can hardly be difficult.

Owing to the disposition of the bones and muscles of the thorax, and to the interference of the heart, it happens that the regions just below the collar-bones in front, and those below the scapular spines behind, are the most accessible to percussion, so far as the lungs are concerned. For the rest of the thorax the position of the heart prevents comparison anteriorly, and posteriorly the ridges of bone of the scapular spines prevent near approach. It happens at the same time, as the student very well knows, that it is these more accessible regions—corresponding with the apices and bases of the lungs—which are apt to give the earliest intimation of disease. The obstacles, therefore, to percussion arising from the causes mentioned, are less important than would at first appear. Percussion is easiest practiced in those parts where its results are most important.

In ordinary or mediate percussion not only are the fingers of both hands made use of, but both must be actively engaged in the process.—While the sound is elicited by the one hand, the other measures the degree of resistance to the stroke offered by the chest-walls. In the healthy chest the finger struck will readily perceive along with the stroke a certain yielding and elasticity on the part of the ribs, varying with the region percussed and with the force of the stroke.[1] This phenomenon of percussion-resistance (variable like the others within the limits of health, and affected especially by the age of the individual) may be so far altered or so distributed as of itself to afford evidence of disease. Thus exaggeration of elasticity on the one hand, as in emphysema, and its total absence on the other, as in the unyielding chest of hydrothorax, are signs of definite import. It is to be remembered, however, that *altered elasticity and resistance may be due to the lungs, or due to their bony incasement;* they are not to be referred to change in the physical state of the organs until it is determined that the ribs and costal cartilages are not responsible for the result.

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[1] In learning to percuss, one hand only can be taught at a time. The hand that strikes will necessarily come under instruction first, and while the art of percussing is being acquired, the student will have no mind to give to the finger that receives the stroke. Afterwards, when the mechanical difficulty, such as it is, is overcome, he will be able to attend, both to the sound of the stroke and to the impression conveyed to the struck finger, as to the character of resistance offered by the chest.

Percussion is likely to err unless the stroke be applied with varying force, gently at first, and afterwards by degrees with greater stress, *each stroke being always at once, in the case of the lungs, compared with a precisely similar stroke over the corresponding part of the other side.* In this way superficial resonance is found to coexist sometimes with deep dulness; what is resonant to a light stroke may become dull or tympanitic or metallic with a stroke of different quality.

In drawing conclusions from the comparative percussion of the two sides over corresponding spots (and unless the spots correspond accurately, rib with rib, interspace with interspace, with one attitude of the fingers, and an equal force of stroke, no fair comparison can be instituted), *we must still be alive to the possibility of some cause external to the lung itself operating to produce a difference.* Such causes are the greater depth of muscle on the right side, as in some artisans, the thickening of ribs from old fracture, or periostitis, cicatrix from healed abscess, thick false membrane lining the pleura, and so forth. Some of these conditions may be the source of error, even where care is taken to avoid them, so that there is justice in the statement that comparative dulness taken alone, and especially as it concerns the right apex, is of little value.

In making percussion of the lungs from above downwards, *the occurrence of dulness higher on one side than the other*, *or the termination anyhow of the pulmonary resonance at widely different levels for the two sides, is not at once to be referred to the fault of the chest.* Obviously it may be due to an encroachment from below the diaphragm. On the left side stomach-resonance may be encountered as high as the fifth rib, while posteriorly enlargement of the liver may occupy some of the space due to the right lung. Similarly in marking out the boundaries of the heart —an examination which requires the recumbent position—it is to be borne in mind that the lungs cover over sometimes more and sometimes less of its anterior surface. Hence *conclusions as to the size of the heart*, *or of the contents of the pericardium*, *derived from percussion*, *may be widely at fault unless the physical state of the lungs be taken into account as well.* Where the point is especially in question, it is desirable to mark out the areas of heart-dulness corresponding with expiration and inspiration respectively.[1] It is one of the most difficult performances of percussion (if we exclude the French achievement of marking out in this way the outlines of the kidneys) to distinguish by the existence of "deep dulness"—dulness, *i. e.*, elicited by forcible percussion—the exact boundary of the heart beneath the overlying lung.

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[1] The area of heart-dulness is usually increased when the patient lies on the left side.

The dulness over the cardiac region is, of course, not necessarily that of the heart; *the examination by percussion does no more than determine the shape and size of the contents of the pericardium.* The area of dulness may be increased in such shape and manner as to lead to the suspicion that this sac is distended with fluid, or that the dulness of an aneurismal or other tumor is continuous with the dulness of the heart, or that a portion of lung in the neighborhood of the heart is consolidated. There is further evidence to come bearing upon this point. What is necessary now is to *determine, upon the present showing*, whether the shape and position of the dulness, the note and character of resistance on percussion, are most in agreement with enlargement of the heart or with effusion around it, or with the presence of some solid material in immediate connection with it.

VIII.

THE CONDITION OF THE CHEST AS FURTHER DETERMINED BY THE SOUNDS TO BE HEARD WITHIN IT, VIZ.,—FOR THE HEART, AS DISCOVERING THE CONTRACTILE FORCE OF THE ORGAN AND ITS MODE OF ACTION, THE EFFICIENCY OR DEFECT OF ITS VALVES, AND THE CONDUCT OF THE BLOOD-STREAM IN ITS COURSE THROUGH THE GREAT VESSELS ; FOR THE LUNGS, AS DISCOVERING THE ABSENCE OR SUPERABUNDANCE OF FLUID SECRETION IN THE LARGE OR SMALL TUBES ; THE PRESENCE AND SITUATION OF SOLID OR FLUID COLLECTIONS ; THE OCCLUSION OF AIR-PASSAGES OR THEIR OPENING INTO POUCHES OR CAVITIES, AND THE DEGREE OF MOVEMENT OF THE AIR WITH INSPIRATION AND EXPIRATION ; AND, FOR THE PERICARDIUM AND PLEURA, AS DENOTING ROUGHNESS OF THESE MEMBRANES BY MEANS OF AUDIBLE RUBBING OR THE INTERPOSITION OF FLUID BY MEANS OF THE ALTERED CHARACTER OF THE HEART OR LUNG SOUNDS.

Auscultation of the Heart.	The character of the heart's rhythm. The sounds of the heart as heard at its apex. The sounds of the heart as heard at its base. The sounds of the heart as heard along the left margin of the sternum, or midway between base and apex. The defining of the *place* and of the *time* of murmurs ; observation of their extension along the course of the vessels or otherwise.

Auscultation of the Lungs.

The character and variations of the breath and voice sounds over the chief regions of the chest in their relation to the healthy standard. The correspondence or otherwise of the two sides.

The defining and localizing morbid sounds, whether modified or additional or extraneous; *e. g.*, from overdryness of the tubes (large or small); from local narrowing or dilatation or obstruction; from oversecretion within the tubes, large or small; from any of the air-passages opening into cavities, or passing through consolidated structure, &c.

Passing from the percussion to the auscultation of the chest, we pass from sounds which we ourselves elicit to those which are produced in and by the organs themselves. We have only to listen for them, and, having fixed in the mind the character and modifications of breath and heart sounds in health, to detect such changes and additions as imply disease.

In the preliminary exercise upon healthy subjects, by means of which auscultation, like percussion, has to be learned, it seems desirable that the heart should be studied before the lungs, and this not because physical diagnosis is easier in the one case than the other—for that is hardly so—but because the normal sounds which are to serve as the standard and pattern in both instances are sooner apprehended for the heart than for the lungs. It goes for something that the beating of the heart is often both seen and felt, that its sounds are distinct and obvious to the unpracticed ear, and that no act on the part of the patient can suspend or modify them.[1]

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[1] The heart's rhythm is easily recognized and remembered, and in a number of healthy persons of the same age and sex there is a

The natural cardiac rhythm is best caught, I think, by comparing the heart's action at various ages from infancy onwards. It is thus seen that the ticking, equal sounds of the infant's heart gradually give place, as life advances, to two distinct and dissimilar sounds, differing in duration, and succeeded by pauses of unequal length. So soon as the ear has once caught the well-marked cadence which arises from the recurrence of these separate sounds, and their pauses in the same order and within the same period of time, any deviation from it, even that which amounts to no more than mere uncertainty of rhythm, will be immediately detected.

Next, *each sound is to be separately studied*, *and the duration of the two intervals.* The student is especially to notice that the first sound gradually subsides into silence, while the ending of the second is sharp and abrupt. Let these natural characters be once recognized in a subject whose heart's action is deliberate and moderate in rate, and it becomes easy afterwards to detect the intrusion of abnormal sounds.

In the healthy heart it is often difficult to fix the

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close resemblance in the general character of its action. It is quite different with the lungs: ordinary respiration is hardly suggestive of noise or movement, and is, in fact, sometimes performed with very little of either. Within the limit of health there is every degree of loudness or feebleness in the respiratory sounds, while the voluntary efforts of the patient, no less than the fact that he is breathing *consciously*, tend to embarrass the listener and to conceal the natural modulation of respiration. Commencing with the heart, the listener is at once satisfied as to the existence of sounds within the chest, and soon learns to discriminate their intimate characters. Commencing with the lungs, the ear very often fails to catch any sound whatever, and the task of discovering disease by such means seems hopeless.

precise instant at which the first sound ceases and silence succeeds. We cannot always assure ourselves of the occurrence of a distinct rest, however short; the echo of the first sound may be so prolonged that it is impossible to recognize any period of silence whatever between it and the second sound, which seems, in fact, to interrupt and overtake it. Such prolongation by no means implies defect on the part of the valves; it is also quite distinct from the soft murmur which has been called "anæmic." The termination of the second sound, on the contrary, is obvious and distinctly marked.[1]

In studying these points for himself, the student must fix his attention especially upon those characters of the heart's action which disease affects, destroying some, altering others; *he must associate always in his mind the successive sounds and pauses with the mechanism which is engaged in producing them.* By this exercise he is enabled afterwards to refer added sounds to their proper place and time in relation to the systole and diastole, and becomes entitled to an opinion of his own in the still disputed question as to the mode in which some such sounds are produced.

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[1] The modifications of which the sounds are susceptible according to the exact spot at which the ear is placed, have been made the subject of very elaborate description. It has even been attempted to convey to the reader, by means of nonsense syllables, the exact sound which he ought to hear in various situations,—"boom-tup, upup tup," &c. Even if the result aimed at could be so attained, such labor would seem to be superfluous. Healthy hearts are always within reach, and may be left to convey their own impression. Those who desire to learn the sounds of the heart without having to listen for them are probably not a large class; they may gather I know not what information from the descriptions referred to.

Satisfied of the character of the heart's rhythm, the pupil listens next in the neighborhood of the orifices.[1] Practically, for auscultation purposes, the mitral orifice, whose own level corresponds nearly with the upper border of the third left cartilage, is approached nearest at, or just above the apex beat. This point is often sufficiently indicated by the visible impulse; where this is absent or diffused, we may judge by percussion, and the loudness of the first sound as to the spot where the left ventricle is most superficial. The aortic and pulmonary valves are, as we know, on a level with the second interspace, the aortic orifice lying behind the sternum. Yet in selecting by repeated trial the exact place at which to listen, so as best to determine the perfect closure of the aortic valves, we are guided mainly by the comparative distinctness of the second sound as the stethoscope is moved along the right edge of the sternum, and that spot may be a little above or a little below this particular level.

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[1] For the readier selection of the fittest spots to listen, and the better confining the ear to a single spot at a time, the stethoscope is undoubtedly useful. It seems desirable, however, to postpone its employment for a while, both to avoid introducing difficulties arising from the mere management of an instrument, and to counteract the notion which prevails that the stethoscope in some way assists the ear. The best way to hear the sounds within the chest is to place the ear in immediate contact with it, but for the further operation of localizing these sounds, and determining to what extent they are transmitted, as well as for the obvious inconvenience of always bringing the ear to the level of the chest itself, we make use of the stethoscope. The time for introducing it is not until this precise limit of its use is clearly felt and understood.

Before quitting the study of the healthy heart, the pupil should recognize the fact that while, so far as the rhythm is concerned, there exists a very exact standard, there are many variations of the sounds in respect of their loudness and obviousness, and the exact pitch of note with which they fall upon the ear, which are quite consistent with health. By listening not to one, but to a considerable number of healthy chests in succession, this fact will become clear. It is not the amount of noise which the heart makes which signifies there are perfectly healthy living hearts which are almost silent.[1]

In the examination by auscultation of a heart suspected of disease two distinct points are in view. *One, the detection of alteration in the size or structure or surroundings of the heart's cavities from the character of the sounds which accompany their contraction and dilatation; the other, the detection of defects in the opening and shutting of the valves in connection with these acts.*

We learn from the books that the sounds of the dilated heart are "weak," those of hypertrophy "loud and clear," and those with liquid effusion "muffled and distant." Yet it is never the sounds alone that can be allowed to settle the question. In by far the majority of cases it is not even true that *the mere sounds* are at all distinctive. Although with the heart, as with the lungs, we feel and percuss, and listen in turn, yet with these successive operations *it is impossible to separate in the mind the bare sound from the impulse.* In the act of listening we are, in fact, made sensible of both these things at the same time; the clear sound is taken along with the heaving impulse, and so on; the impression conveyed is the impression from both. The evidence from the sounds does no more than supplement the evidence from the other signs. It completes the material upon which the ultimate conclusion is to be based.

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[1] It is not inconsistent with this statement to add, that *for the same individual* differences from time to time in the loudness of the sounds of the heart, and especially of the first sound, imply differences in its working force, insomuch that the first sound may become even a measure of the bodily strength.

With reference to the added sounds of the heart,[1] *the main points are to determine between those which are within and those which are without the heart; and, of the former, to distinguish the organic from the inorganic*, those which arise from obstruction or imperfect closure of the orifices from those which imply no lesion of structure, and whose cause is often little understood. It may be useful to remember that these inorganic murmurs (which, though associated with the anæmic state, are by no means confined to it), are almost always systolic; that over the large vessels they are sometimes produced by pressure, and may be modified in character by varying the degree of pressure; that in weakly persons the subclavian may develop a murmur, from some unknown cause, which shall disappear with improved health; and that, in connection with the heart, these functional murmurs belong to the neighborhood of the aortic and pulmonary valves. In this situation, indeed, *soft systolic bruit is not of itself indicative of organic disease.* It may be added that systolic mitral murmur, due to a temporary regurgitation, occurs sometimes for a while in connection with anæmia and purpura, and in other blood diseases, when these are accompanied by extreme prostration. Hence, for interpreting the meaning of a bruit, it is necessary to consider the general signs and the history of the case. A mitral murmur, for instance, will have one meaning in a patient with rheumatic fever, and another where an unusual stress is laid upon the heart, and evinced by external signs of venous congestion.

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[1] I purposely leave the student pretty much to himself in reference to the *time* of murmurs. I think, in the present state of the subject, that is the best course to pursue. Let the pupil say for himself whether a murmur is to be called diastolic or præsystolic, whether the sounds of the heart are four, or six, or eight, or two—there are authorities for each of these statements. With the requisite training, the hearing of youth is very acute, and in auscultation each generation seems likely to hear more or otherwise than the last.

Organic murmurs following both sounds of the heart, and reduplication of both sounds without murmur, may be mistaken one for the other. Such reduplications may in general be recognized by their intermitting; the doubling of the sounds is not constant. But apart from this, the character and place of murmurs are in general sufficient to distinguish them as such.

It is more difficult, in certain cases of double bruit, *to make certain whether the added sounds proceed from without or from within*, from valvular murmur or from the audible rubbing of a roughened pericardium. True, this friction-sound is, in many instances, of itself quite distinctive, not masking the natural heart-sounds, but occurring in addition to them, and giving to the ear a clear notion of the cause of the phenomenon. But from accidental causes *the times of the to-and-fro rubbing may exactly correspond with the times of the two murmurs, while the sounds themselves may be precisely similar to murmurs.* Apart from the assistance which the history affords in such cases, a diagnosis from the mere sounds themselves is obviously impossible. *It is to be arrived at, however, sometimes by a sense of the nearness and superficiality of the sound.* This is sometimes clearly apprehended as the listener applies his ear *immediately* to the præcordial region. Again, *the rubbing sound is apt to vary from time to time.* At certain periods some slight modification in the cardiac action may bring out the sound as clearly one of rubbing, and distinct from the proper heart-sounds. Sometimes alteration in the posture, as leaning far forward or well over upon one side, may thus suffice to exhibit obvious friction; or, short of this, it may so alter the character of the sounds as greatly to favor the view of pericarditis.

Of all the changes incidental to the heart we place by themselves certain possible conditions which occur with great rarity, and are to be predicted only upon extraordinary evidence. Were this fact overlooked, and all the morbid changes to which authors have given names regarded as equally common, a very exaggerated notion would be conveyed of the difficulties of diagnosis. Thus, for instance, in regard to the walls and cavities of the heart, we may almost dismiss from the account simple dilatation, and assume that, according to a very general, though not invariable rule, wherever dilatation occurs, there will occur also a certain amount of hypertrophy. Similarly, dilatation of the left ventricle carries with it, or makes highly probable, dilatation of the right ventricle also. Again, valvular disease is so much commoner for the left side than for the right, that in any ordinary examination, the first, though not the sole object, is to ascertain the condition of the mitral and of the aortic valves. Yet, intermediate between the apex and the base of the heart, along the left edge of the sternum, are two other valvular orifices, the pulmonary and the tricuspid. A murmur heard loudest upon this line will suggest the existence of obstruction or regurgitation on the *right* side of the heart. The rarity of either occurrence demands only that the evidence should be ample. It is to be remembered that tricuspid regurgitation, which to a certain extent is probably a phenomenon of health, does not always occasion murmur, and that when it does so the bruit is often altogether masked by the louder one of coexisting mitral regurgitation. The sounds produced by narrowing of the tricuspid orifice are matter of inference rather than observation. The same may be said of the character of the regurgitant murmur with defective pulmonary valves. Such a condition is often suspected when aortic regurgitation happens to be heard, as it will be sometimes, more distinctly at the left than at the right edge of the sternum. On the whole, it must be confessed the diagnosis of diseased condition of the valves of the right side often turns out disastrously. The fact, while it shows the necessity of caution, is not to be used as a sanction for neglect. It is better to err by the misinterpretation of observed phenomena than to be right from the accident of having altogether overlooked them.

In studying the sounds of respiration, the same plan may be pursued as for the heart—that of listening in succession to the breathing of infants, of children, and of adults; and next, so soon as the general character of respiration has been learned, noting the several variations in the sounds proper to different regions of the chest.

Respiration, it will be found, is not performed in the same obviously rhythmical manner as pulsation. The quiet breathing of a healthy man may not at first reach the ear at all. It is well on that account to listen first to the quicker and more audible sounds of early life. Note particularly the feebleness of the inspiratory murmur of infancy, and its passage, with growth, to the loud, coarse inspiration of childhood. Contrast this, again, with the soft sighing of pure vesicular breathing as it is heard at the back of the chest of the adult, and with the supplemental or "puerile" respiration of a patient breathing with one lung only. Take next a number of persons unsuspected of chest disease, and compare in them all the length and tone of the inspiratory as compared with the expiratory sound or murmur; observe in what proportion of such cases, and in what parts of the chest this expiratory murmur becomes faint or even inaudible, and in what proportion it is louder, or harsher, or more prolonged for the one lung than for the other.

The cadence of ordinary adult respiration is not caught at once. The ear does not acquire readily, as with the heart, the sense of a sustained rhythm of sounds of certain character. The respiratory sounds follow each other too slowly, and the mind of the patient is too much directed to the operation. Instead of breathing naturally, he times the act, as he supposes, to suit the purpose of the listener. Moreover, the rate of breathing, and the noise of it, vary considerably within the limits of health. Hence the standard of normal breathing is less precise, as well as less accessible, than the standard of normal heart-action. To compensate, we have two organs instead of one. With all the varieties of respiratory sound, every healthy person may be expected to breathe the same with both lungs.[1] So that in the large number of instances where one side only is affected, we have always the means of comparison at hand. Any abnormality which may be suspected in the one lung may be at once measured by means of the other.

For the auscultation of the lungs the position of the patient will be the same as for percussion. In listening posteriorly, the ear should be applied directly to the chest-walls, with the intervention only of a single fold of linen. The stethoscope may be employed afterwards for the front of the chest, and for estimating the degree of conveyance of the voice-sounds.

By percussion and the other methods, the side to which the disease is confined, or where it is most advanced, will have been already ascertained or conjectured. *Auscultation should commence not there, but over the corresponding spot of the healthier side.* By this means the character of the healthy breathing, or of the breathing nearest to health, is first ascertained; and the ear is the better fitted to appreciate the altered sounds of the affected side.

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[1] It may be objected that healthy persons do *not* breathe the same with both lungs. They do so nearly, but not quite. The expression, though inexact, is not misleading; for strict accuracy one would have to add that certain characters of the breathing are apt to be exaggerated on the right side.

It happens sometimes at first that the student fails to hear any breath-sound whatever over any part of the chest. Either the case is one in which respiration is naturally indistinct and noiseless, or the absence of sound is due to an alteration throughout the entire structure of the lung, whereby the air is delayed in its exit and entrance. The shape and the movements and the percussion of the chest will at once determine that question, and patient listening will detect at last either the sounds of health or the sounds of emphysema. *Thus the observation of inaudible or nearly inaudible breathing over all parts of the chest alike is of more than negative value.* The general tendency of lung disease is to render the breathing unequal, augmenting it in one place and abolishing it in another. Uniform silence, therefore, or what is taken for such, with unimpaired chest-movement, is so far in the patient's favor.[1] It is customary, under these circumstances of embarrass-ment, to bid the individual take a deep inspiration—an act which gives birth to a single sound, and is succeeded by silence deeper than before. The better plan seems to be to address some question to the patient, listening not for his reply, but for the respiratory sound which immediately precedes it. Every one instinctively takes a deep inspiration before speaking, but many seem hardly capable of fully inflating the lungs at another's bidding. This plan of speaking to the patient has the further and incidental advantage that, while rendering respiration audible, it reveals as well the character of the vocal resonance (a sign to be further alluded to presently), and may in some cases render the formality of getting the patient to count or repeat a particular word unnecessary.

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[1] It happens not unfrequently that this low-toned respiration is found along with hæmoptysis, and the notion that nothing is amiss because nothing is heard is contradicted by a deluge of blood. Yet hæmoptysis is to be remembered as sometimes a very early symptom of lung disease, and there is the additional difficulty in determining its source, that these patients, while the hemorrhage lasts, cannot be freely handled.

It is not, of course, to be supposed that no sound is produced because none makes itself audible to the beginner, or that any living lungs are absolutely silent. It is a remarkable phenomenon in auscultation that the ear catches most readily the sounds it is in wait for, so that of two individuals of equal hearing capacity, the one shall be conscious of a sound from knowing beforehand the sort of sound to expect, and the other shall be wholly unconscious of it because his expectation has fixed upon no sound in particular. Thus, beyond our daily experience that innumerable sounds all about us pass unheard from our inattention, is the fact that there are sounds which cannot be caught by mere general listening, or until the ear is in some way prepared for their reception. Thus it happens that certain murmurs of the heart and certain sounds proceeding from the smallest air-tubes are commonly unperceived at first by learners, not so much from the faintness of the sound as from its being unfamiliar. It is not, as might be supposed, that the sounds are heard indistinctly at the beginning, and that by degrees the ear defines their character; they come upon us suddenly, as by the acquisition of a new sense, and once acquired, it seems strange and incredible that anybody should miss them. There is reason to believe that some practitioners go through life without ever fully recognizing certain sounds, of which the names and import are perfectly familiar to them.

The sounds within the chest which guide us to a knowledge of its physical state are not all of equal value. Those will be the most instructive whose cause is least open to dispute, while all verbal refinements upon nice gradations and varieties of sound will be regarded as trivial unless each of those can be yoked with a corresponding variation in the actual condition of the organ. Under this estimate we shall have auscultatory signs of every degree of value; those, the best, whose mechanism and mode of production are perfectly well understood; others, of less use because attributable to more than one cause; and some which may be interpreted in such various ways as to be practically useless. As ready examples of these several classes, there is the splashing sound of fluid, which denotes with certainty the presence of a cavity; and there is that conveyance of the voice called pectoriloquy, which denotes sometimes a cavity and sometimes the neighborhood of condensed or of collapsed lung; and there are the various inorganic murmurs of the heart and h ming murmurs of the veins, and the numerous m fications of bronchial breathing, which arise in many ways, that for our present purpose they n be said to signify nothing.

This classification of sounds, according to th relative weight as direct evidence of disease, is more to be insisted on, because learners of the ar auscultation are naturally prone to believe that th signs are of the most value whose acquisition c the most labor, or whose character is the most cussed. They treasure in their memories sou which are curious, but little instructive, and sometimes proud of their familiarity with th when as yet they have hardly asked themselves w such signs really mean.[1]

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[1] Auscultation seeks its terms indiscriminately from a wide range of objects, from the bleating of a goat to the tink of a cracked pot. It has names derived from theories of the mec ism of the sound, as "moist" and "dry," and "rubbing;" na derived from a preconceived view of the place which the so occupies in the series of phenomena, as "crepitatio redux;" names which seek to restrict the sound to some specified diseas "pneumonic crackling." Every writer upon the subject is bitious to invent some new expression, or to refine upon those he finds. Hence we have an extraordinary medley of incongr expressions, "moist crackling," "hollow bubbling," "buz amphoric echo," and the like, of which the only result is confus What I would impress is, that the whole aim and object of aus tation is to ascertain physical conditions, and that, failing of t the happiest description of its character and the most apposit names can lend no value to an uncertain sound. So soon as meaning of a sound is understood, the fancy may have free pl it may remind one of the bleating of a goat, and another of voice of Punch.

The nomenclature of lung-sounds being thus ample and e

All abnormal signs whatever within the chest are referable to one of three headings: they are either modifications of the natural sounds; or they are additions to them; or they are independent sounds of extraneous origin connected with the pleura or pericardium. Thus, for the lungs there are:

I. *Alterations in the natural tone or duration of the respiratory sounds, whether absolute or relative, no new sound being superadded.*—These may be illustrated by reference to the healthy chest. Whoever has studied the respiration of health will recognize the several modifications which the two sounds undergo at various parts of the same lung. The breathing is vesicular at the bases of the lungs; bronchial, more or less, between the scapulæ; and tubular over the trachea. In listening at these several regions in succession, the soft inspiratory sighing first heard gives little idea of the mechanism of the sound; as the bronchi are approached, the motion of air travelling through tubes becomes more and more distinct, until at last, when the trachea is reached, there remains no other suggestion of sound than that of air moving in and out of a stiff pipe. The same thing, with a difference, is repeated in disease. The breathing

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redundant, every one has a right to select his own terms. Let these have reference as much as possible to physical conditions, so as by the name to refer the sound to its place and cause, and as little as possible to fanciful resemblances in the great world of nature. A complete nomenclature, which shall include all the sounds to be met with in the chest, must of course provide names where the locality and significance of the sound are matters of uncertainty. These are mere names, and go to no more than a bare description of the sound derived from some resemblance which strikes the hearer, whether produced by the same or a quite different mechanism.

may here be bronchial, not from the neighborhood of large tubes, but because the blocking up of the smaller ones raises the proper sounds of those which are next larger into unnatural prominence; or, it may be strikingly "tubular" where the air is admitted no further than the larger bronchi, and the solid lung conveys the sound of it with extra distinctness, and of altered quality. These are no more than modifications of the same two sounds, and, while the situations at which such modifications are audible may indicate disease, the sounds themselves have their counterpart in the healthy state; there is no sound added.

It is difficult, and probably impossible, except for the help of contrast between the two lungs, to fix *that least amount of departure from the standard of healthy breathing*, in the direction of "coarseness" and "blowing character," and so forth, which is necessary to constitute evidence of disease.

II. *Additions to the natural sounds which may either precede or follow them, or altogether mask them and take their place.*

From the time of occurrence and the locality of such sounds, they are perceived to be connected with the same agency or mechanism as that which gives rise to the natural sounds; with the movement, that is, of air within the lungs in inspiration and expiration. The sound is *added* to the others; it breaks in upon, or it replaces one or both of them, and is obviously due to some defect or obstruction in the working of the machine.

Sometimes the particular character of such added sound suggests at once the mode of its production, as in the bubbling of fluid with inspiration; sometimes the particular time of the sound's occurrence connects it with the faulty performance of some part of respiration, as in the prolonged expiratory rhonchus of emphysematous bronchitis.

The division of added sounds into *large* and *small*, corresponding with the larger and smaller bronchial tubes, is so fully concurred in by the hearing sense, and of such practical significance, that it may fairly be admitted. Still more, "gurgling," and "splashing," and "bubbling," are terms to be admitted as perfectly unambiguous and definite. It is less obvious to speak of "moist" and "dry" sounds. The ear—or at least some ears—fail to acquiesce in the distinction; and, in fact, the precise mechanism of the sounds so denoted is sometimes doubtful. *The single circumstance that moist sounds and the sounds of dry pleuritic friction are sometimes precisely similar is enough to show the insufficiency of that plan of nomenclature.* We are thus compelled to introduce another set of expressions, which shall describe the bare character of the sound, *the sort of sound*, without denoting the physical condition on which it depends. In this place the word *crepitation* seems admissible. It describes a very definite sound, due sometimes to an undetermined cause. Its division into *large* and *small* and *minute* accurately denotes well-marked modifications in the fineness of the sound, which yet retains throughout the character to which it owes its name. Whether it be moist, or dry, or rubbing, we may be in doubt; it is at least a crackling sound, and—not unmindful of the points which in such case auscultation leaves unsolved—we speak of it as such with the certainty of being understood, and with the same warrant as we speak of any other sounds in nature, by the terms which best characterize them.

III. *Extraneous or adventitious sounds occurring in those localities where in health movement is performed silently.*

Such especially are the rubbing sounds of the roughened pleura. It is sometimes extremely difficult, or even impossible, to distinguish by the ear whether such sounds arise from within or from without, from the lung or from the pleura. *The rubbing of the pleura may closely resemble large crepitation, just as the rubbing of the pericardium may closely resemble double endocardial murmur.*[1] In either case the information which the ear conveys needs to be supplemented by other means.

To be included among adventitious sounds would be *the varieties of echo produced wherever air is conducted through a tube abruptly into a large cavity which is without the lung.* An instance of this is furnished by perforation of the pleura admitting air into the pleural sac. Yet in mere sound there is nothing special in this condition to denote that the pleura is concerned in it. Physical methods will inform us nearly of the situation of the cavity and the thickness of its outer wall; they will not inform us in all cases whether this boundary is made by lung or by pleura.[1]

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[1] The point has already been alluded to (p. 86), so far as the heart is concerned. For the lungs, the fact that the sound is confined to one side, is strictly localized to a spot below the axilla, and not altered by cough or by deep inspiration, depones in favor of friction.

It is a common direction to pupils, in cases where friction is present, to determine whether the pericardium or the pleura is making the noise by causing the patient to hold his breath for awhile; yet it is not to be overlooked that, although the lungs be still, the action of the heart may itself give rise to pleural friction and impart to it its own rhythm.

The particular pitch and quality of tone with which the voice-sound is conveyed to the ear of the listener at different parts of the healthy chest is quite easy to appreciate. In disease the sign is to be looked upon as merely of corroborative value, and, as with vocal fremitus, to be used chiefly by way of comparison of one lung with its fellow. The phenomena of voice known as *bronchophony* and *pectoriloquy* have no absolutely fixed boundaries, or none which are generally acknowledged. It is sufficient (dissociating the sign altogether from the mere loudness or lowness of the voice) to mark under this head *the clearness and ring with which the words uttered by the patient are conveyed into the ear of the listener, and to note whether or not along with great clearness or brassy ring of the voice there is also a quavering tremulousness which alters its quality, or a peculiar conveyance through the pipe of the stethoscope of the word spoken, as though the*

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[1] It thus appears that the classification above mentioned cannot always, even where the origin of the sound is beyond dispute, be accurately observed. As between the first and second categories, it may be a question to be differently settled by different hearers, whether a particular sound is best described as a modification of the sound of health, or as new and added; and, as between the second and third, it may be difficult with one tone falling upon the ear, to separate into its factors a sound which in fact partakes of both elements. Not the less are the divisions useful as helping us to avoid the error of regarding auscultatory signs in the abstract apart from what they signify.

patient's lips were at the other end whispering up it. The most healthy chests afford instances of bronchophonic resonance at the upper part of the interscapular region. Pectoriloquy in its perfection, whatever its value, is so remarkable a phenomenon as to be immediately recognized when once pointed out. So, indeed, is *ægophony;* yet there is reason to believe that, notwithstanding the distinctive character of this sound, mere exaggeration of the voice-sound, such as occurs in consolidation of lung, is by some persons habitually mistaken for it. *Ægophony is bronchophony, together with tremulousness more or less.* Measuring the value of voice-sounds by the certainty of meaning which attaches to them, we might not estimate this particular sign very highly. Yet the word is not ill chosen to describe a peculiar quavering of the voice, which is distinct altogether from its increased intensity or the shrillness of its note.

It is of the utmost importance that the province of auscultation should be correctly estimated, and that there should not be laid upon it a burden greater than it can bear. From the frequency with which certain physical signs are found associated with certain diseases, the former are always likely to suggest more than in themselves they can prove. *Auscultation, in deposing to the existence of a cavity in the lung, or of fluid in the pleura, gives no information whatever as to the nature or origin of either the one or the other.* It can give none. The conclusion from such evidence that we are dealing with phthisis or with pleurisy, whether true or not in the particular case, is an altogether unwarrantable assumption based upon the fact that in a large number of instances these physical conditions are connected with the diseases in question. In thus failing to apprehend the share that belongs to physical methods, we render ourselves not only liable to error, but perfectly certain to err in all but one set of circumstances.[1]

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[1] Among the worst results of such misapprehension is the attempt to recognize the earliest signs of disease wholly from the telling of the stethoscope. It is conspicuous in the case of phthisis. A prolongation of the expiratory murmur at one apex will be fastened upon as of itself an indication of a disease which every one would be before his neighbor in recognizing. There is a manifest temptation to lay stress upon signs like these, which may serve as the first warning of a coming evil. Nevertheless, a consideration of the kind of evidence—especially of post-mortem evidence—which would be necessary to determine the precise value of a sign like this, together with the improbability, from the nature of the case, of any such evidence being attainable, should be sufficient to restrain the utterance of such opinions.

IX.

THE CONDITION OF THE ABDOMEN AS DETERMINED BY ITS INSPECTION AND EXAMINATION WITH THE HANDS, AND BY PERCUSSION, AS WELL AS BY THE PHYSICAL AND CHEMICAL ANALYSIS OF THE EVACUATIONS AND SECRETIONS.

Inspection.	Movements of the abdominal muscles with respiration. Distension or retraction of the abdominal walls. Unevenness of outline of the abdomen.
Palpation.	Sense of resistance obtained by manipulation, and by making pressure over the chief regions. The accessibility of other organs, *e. g.*, of the spleen and kidneys. The existence within the abdominal cavity of solid or other tumors; their texture and movableness and apparent connections. Distension, whether from fat, fluid, flatus, or pregnancy.
Percussion.	Detection of the presence of fluid and of the size and boundaries of the sac which contains it, by "fluctuation," and by the changing level of the fluid with change of posture. Mapping out the boundaries of dulness due to the presence of solid bodies, whether organs or not.

ANALYSIS OF THE EVACUATIONS AND URINE.

The Fæces.	Color and consistence; admixture of bile; its absence or excess. Presence of blood, mucus, pus, gallstones, undigested food, or other things. Any appearance whatever of the stools which is unusual.
The Urine.	Its quantity in a given period, specific gravity, clearness when passed, and upon cooling. *If clear*, the effect of boiling, solubility or insolubility of the pp. with nitric acid. *If containing a deposit*, the fluid clearing or not —(1) with heat; (2) with acetic acid; or (3) nitric acid; or (4) an alkali. The tests for the presence of sugar. Examination of the quantity of sugar.

The abdomen, more often than the thorax, whose organs perform their functions audibly, offers to physical examination merely negative results. The diseases of the abdomen, however, are indicated by other phenomena than those of altered size or consistency appreciable by manual examination. Some of these are learned from the patient's own account of his sensations, and some of them from testing the secretions and evacuations.

Sometimes by inspection alone—by observing, that is, the general contour of the abdomen—a presumption will be raised as to the cause of its distension or retraction. Thus, for instance, fluid in the peritoneum, pressing out the lower ribs, and distending the whole peritoneal sac, may be distinguished often by its mere shape from fluid confined within an ovarian cyst, and which the eye perceives to be so shut in from the rounded contour of the swelling. Often, too, it will appear to the eye that a particular organ, as the distended stomach, or enlarged liver or spleen, is pushing out one part of the belly, so as to give an unequal outline. The immovable abdomen of peritonitis is also recognizable by the sight. Visible retraction of the walls, though common in several forms of pain within the belly, is not a constant accompaniment of any. As contrasted with the motionless belly of peritonitis, is that in which respiration is mainly performed by the abdominal muscles and diaphragm, while the chest is almost still.

The exploration of the abdomen with the hand will only yield reliable results when performed with caution and patience. It is quite useless to attempt it so long as the muscles resist. The operator should have his hands warmed to the temperature of the patient's body, and should approach by degrees the region which is to be more particularly examined, desisting whenever contraction of the recti muscles is perceived, the patient the while lying evenly on his back, with the knees flexed, and the head and shoulders slightly raised. By slow degrees the amount of pressure may be increased here or there over doubtful spots. With time and care and gentleness, with a flaccid condition of the abdominal walls, and these not overladen with fat, the fingers can dip down amongst the intestines so as to make out the boundaries, and connections, and degree of movableness even of deeply-seated tumors. On the contrary, the sudden introduction of the cold hand to the abdomen immediately provokes rigidity. It entirely defeats the object of the examination, and gives rise sometimes to the most absurd blunders, from knotted muscular contraction being mistaken for a hard tumor within the cavity of the belly.

Palpation is performed in the first instance while the patient lies on the back, in the position just mentioned. It may be afterwards needful to seek further information by changing this position, so as to bring certain organs within easier reach, and to observe the manner and degree in which fluid within the abdomen follows the movements of the body.

Thus, *enlargement of the liver may be rendered more obvious by turning the patient over upon his left side*—the knees being still flexed—while the fingers of the operator, directed upwards, are inserted under the lower edge of the organ. A full inflation of the lungs will then push the liver from under the cover of the diaphragm, and often bring its inner surface within touch, so that unevenness or knobs projecting from it may be felt.

For the proper examination of deeply-seated tumors in connection with, or in the neighborhood of, the kidneys, it will be necessary to place the patient flat on his belly, and to manipulate the flank between the fingers of the two hands, the one at the back, in the spinal groove under the last rib, the other in front, opposed to the first, and pressing towards it, below the liver-line. By depressing the hand in front (granted that the muscles of the patient remain relaxed the while), and pressing in its direction with the other, the kidney may be pushed forward so as to come within touch of the two.[1]

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[1] It is asserted that by manipulation with the hands the size of the kidneys themselves may be nicely estimated. It is hardly

The enlarged spleen may be known by its movableness, and often by its shape. It moves with respiration, and when pushed by the fingers; and its anterior margin, when this is to be felt, is sharp and notched. The spleen, moreover, is not covered by the colon, as would be a tumor connected with the left kidney.

The methods of manipulation here alluded to are easily acquired at the bedside. They are useless without an accurate acquaintance with the topography of the viscera. It is necessary to know beforehand, and to know with exactness, the regional anatomy of the abdomen, the exact relation of the parts to each other, and all the sensible qualities of the organs concerned.

Where it is obvious from palpation, that a tumor exists anywhere over the course of the larger abdominal arteries, and that it pulsates, we have next to discover whether such pulsation belongs to the tumor itself, or is communicated by the vessels with which it is in contact.—If the former, this pulsating movement will not be a mere lifting up, but alternate dilatation and contraction of the whole lump, which may be felt sometimes laterally as well as from above. If the latter, a change of the patient's posture may withdraw the tumor from close contact with the artery, and for the time arrest or diminish the pulsation. It must be added that these methods of distinguishing between the two conditions often fail in practice;

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conceivable that small changes in the size of the organ can be thus discovered, or even that the method should distinguish always between a large kidney and a tumor in close connection with the kidney.

many circumstances will suggest themselves to render them inoperative; so that physical examination alone is often insufficient to determine the diagnosis.

Some caution is always necessary in interpreting the meaning of abdominal pulsation.—Pulsation may be communicated to the epigastrium in many ways: from a dilated and displaced heart, or from the beating of the abdominal aorta, or cœliac axis, or, not seldom, from causes which can only be conjectured. *Of itself, it is no sufficient evidence of aneurism or tumor, or, indeed, of actual disease of any kind.* The same may be said of pulsation elsewhere in the abdomen; that symptom alone can depone to no particular lesion; it is significant only in its associations. Even when along with pulsation a bellows murmur is heard, we must be satisfied, before resorting to the view of aneurism, that the bruit is not communicated from the heart or caused by pressure.

The possibility that abdominal tumors may depend upon fecal accumulation is always to be kept in view, and in all doubtful cases, the clearing out of the bowels should precede the diagnosis.

The manipulation of the organs of the abdomen may be at once or early arrested by the presence of general or local tenderness, by extreme fatness, or by the distension of fluid. Each of these conditions carries its own instruction. The tenderness, if real, will have other symptoms to define it; the fatness will of itself exclude certain diseases; the fluid at once directs us to a definite path of investigation in regard to its seat and origin.

When fluid is suspected, the mode of determining its presence, and the boundaries of the cavity which confines it, is, first, by eliciting the phenomenon of "fluctuation;" and, secondly, by percussing the abdomen in various postures of the patient's body.

The method of producing fluctuation is, by placing the two open hands on opposite sides of the suspected cavity, and gently tapping with the fingers of one, so that the other may perceive the movement of the stricken fluid—a perfectly simple process, although nicety in the production of fluctuation may still require practice. It is possible at first to mistake for it the trembling vibration produced by striking a fat-laden abdomen.

When by this procedure the presence of fluid has been ascertained, we have next to determine, by observing the direction and freedom of the fluid's movement, the dimensions and character of the cavity which holds it. It may be loose in the peritoneal sac, or bound down or encysted, and so not permitted to alter its level with the patient's movements from side to side. Percussion determines the point. The patient is examined first while lying on the back to ascertain by the percussion-note the exact level of the fluid in that position; and next, lying over upon either side, to measure in the same way the extent to which that level is alterable with the altered posture. In this way the limits within which the fluid is confined are more or less accurately fixed.

It is to be observed, however, that *nothing more than this is determined by these means.* It is obvious that fluid may be bound down either by old adhesions between the intestines, or by being shut up in a sac of its own. The observation of the fluid's gravitation in different postures does not determine which. Again, the intestines may themselves be tied down by old adhesions in such manner that change of level on the part of freely-moving fluid in the peritoneum can make no change in their position. Ascitic fluid in such a case would shift its position from side to side with the patient's movements, but the bowel would not float upon its surface as in the normal condition, and as in the rules of the books it ought to do. Hence *it is not unusual for cases to occur where it is impossible to determine upon physical grounds alone between ascites and other fluid collections.* All that the physical examination can demonstrate is the presence of the fluid and its boundaries, whether it is freely movable in the peritoneum or confined within narrower limits. In the latter case the particular limitation of the fluid may be consistent with more than one view of its nature. The history and surroundings of the case must make out the rest.

The previous examination of the thorax should suffice to prevent any error which might otherwise arise from mistaking displacement of the liver or spleen by the pushing down of the diaphragm for enlargement of those organs.

In percussing the liver, its upper margin may be rendered indistinct, as it is traced from right to left, from the dulness of liver being continuous with the dulness of dilated heart. Practically, the marking of the apex-beat and of the limit of cardiac dulness to the right, will sufficiently determine the point of passage from one organ to the other; there is, besides, a difference in the degree of resistance to the percussion-stroke, which is greater for the liver than for the heart.

EXAMINATION OF THE FÆCES AND URINE.

When the several regions of the body have been separately explored, there yet remains, as a further source of information, *the physical and chemical composition of the evacuations and secretions*, and of the blood itself. This investigation, which in certain branches of it is properly one of the laboratory, comes fitly in this place, since it has to be governed in great measure by what has been already ascertained or suspected of the patient's state.

The examination of the fæces is of direct and positive value in certain instances only. It will be apparent at this stage of the inquiry whether the particular case falls within this category or not.

In the case of the urine, an examination is never to be omitted.—The variations in this fluid from time to time afford the surest test of variations in the general health, while not seldom a number of symptoms hitherto obscure and anomalous find their explanation in the same way. The mode of examining the urine quantitatively and qualitatively forms part of the knowledge with which the student is credited so soon as he commences clinical study. The points mentioned in the table are set down merely for the purpose of completing the general plan by an enumeration of those tests which we are in the habit of applying at the bedside. As has been said, the patient's answers will often serve to direct and limit the employment of those tests, and they will always suggest the order in which they should be applied. Should the examination reveal any abnormal condition of urine, it will be necessary to interrogate the patient once more upon matters bearing upon that particular point.

The clinical examination of the urine may fairly be separated from its complete chemical analysis. The one process consists in the application of simple tests, easily applied at the bedside, together with the inspection of the fluid by the microscope; the other includes a number of operations, more or less complicated, demanding time and manipulative skill, with all the resources of a laboratory. The clinical examination, however, must be complete of its kind, and should comprehend the following points:

Observe the quantity[1] and color of the urine, the presence of lithatic or any other deposit, crystalline or not, or of pus, mucus, bile, or blood. If the nature of such deposit is not apparent, the microscope must be appealed to.

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[1] If especial interest attaches to the *quantity* of the urine, it should be collected for twenty-four hours on several successive occasions and measured. All quantitative examinations (as of sugar, urea, uric acid, &c.) should be made upon a portion of the urine thus collected, so as to give the amount of the substance in question for twenty-four hours.

For the extenuation of urea, phosphoric acid, chloride of sodium and sugar, the volumetric method may be applied—albumen may be easily estimated by coagulation; but it is not now my purpose to describe the analysis of urine, or to handle methods which require the apparatus of a laboratory.

Note the specific gravity (if this is above 1025, test for sugar or excess of urea), and whether the fluid is acid or alkaline; if the latter, whether from fixed alkali or ammonia.

It may be useful to remind the student of the rough-and-ready tests for the urinary substances which are the most direct in their clinical indications.

Albumen and *sugar* are first and second in importance. As they are practically absent from healthy urine, their presence, in however small quantity, is an indication of disease.

With regard to urea, uric acid, and the earthy salts, these are always present; yet they often give important indications by their variations in quantity.

Albumen is most surely tested by boiling the urine in a test-tube, and while still hot, adding a single drop of nitric acid.[1] If heat cause a precipitate, it is either of albumen or phosphates. If it be albumen, a small quantity of nitric acid will not dissolve it; *if it be phosphate, the minutest portion of this acid will cause its instant solution.*

Heat alone may not cause precipitation of albumen in alkaline urine. The acid, however, when added, will at once determine it.

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[1] The experiment may be delicately conducted by filling a test-tube three-quarters full of urine, and boiling the upper stratum, leaving the lower for comparison. The plan is useful when the urine is lithatic, and the albumen in small quantity. Three conditions of the fluid are then displayed: the lower stratum remains cloudy with lithates, the upper has become cloudy from boiling, and, intermediate, is a portion which is clear from being warmed.

Sugar is roughly indicated by the brown coloration of urine when boiled with an equal bulk of liquor potassæ. The test is not a delicate one, and does not show the presence of sugar in small quantity. It is also liable to error, since a similar coloring may arise from matters other than sugar.

The reduction of copper by grape-sugar from the protoxide to the suboxide is the basis of a more accurate method. One or two drops of a solution of sulphate of copper should be added to a little urine in a test-tube, and afterwards as much liquor potassæ as urine. With boiling, the presence of sugar will be shown by the appearance of the suboxide of copper. If no sugar be present, the black protoxide will appear without any admixture of the other.[1]

Excess of urea, which may often be inferred from a high specific gravity, may be roughly shown by adding to urine in a test-tube half its bulk of nitric acid. After standing in the cold, if urea be much in excess, crystals of nitrate of urea will form, and occupy half or two-thirds of the liquid. For accurate observation, Liebig's volumetric plan must be resorted to.

Uric acid in excess will often be evident by spontaneous precipitation as red gravel. It may be thrown down from urine by the addition of hydrochloric acid, twenty-four hours in the cold being allowed for the process.

Earthy salts must be judged of by the amount of precipitate afforded by the addition of liquor potassæ.

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[1] In measuring the quantity of urine passed daily in diabetes, the amount of fluid from the bowels and from the skin has to be taken into account.

Microscopic examination reveals immediately any admixture with the urine of pus or blood-corpuscles or epithelial cells (not of themselves indications of disease), or the presence of casts of the uriniferous tubes, whether containing blood-corpuscles or whole or broken epithelium, or pus or fibrin, or these elements in combination. It is necessary that the student should become familiar with these objects, so as to avoid mistaking them for extraneous matters accidentally present, which remotely resemble them.[1]

Abnormal states of the urine, as the admixture of blood or pus, or the presence of albumen, are not at once to be taken as evidence of renal disease. The probability that the bladder itself, or any part of the urinary course, intervening between the kidney and the outlet, has contributed one or other of these ingredients to healthy urine, has first to be considered. It must also be ascertained that the urine has not undergone change from long residence in the bladder.

The discovery of albumen in small quantities in scarlatina, or pneumonia, or typhus, is an occurrence whose exact significance cannot immediately be estimated. It may remain doubtful for the while whether the condition is a feature of the acute attack, or the patient is the subject of renal disease. It must be carefully ascertained that the urine to be examined is free from accidental admixture from whatever source. Catamenial or other discharges from the uterus or vagina render the analysis of the urine for the time impracticable. Careful inquiry upon these points is always necessary.

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[1] The urine for microscopic examination must be the bottom stratum of a portion which has remained undisturbed for a short time in a perfectly clean glass, the upper portion being first carefully drawn off.

The time at which the urine is passed should be taken into account, with reference especially to the time of meals and description of food. For complete acuracy, therefore, the examination should be repeated at different stages of the digestive process.

X.

THE DIAGNOSIS.

By diagnosis something more is signified than the technical naming of a symptom or a group of symptoms. The employment of medical phrases is, indeed, the commonest mode of hiding from ourselves, as well as from others, the insignificance of our conclusions. When any divergence from health can be expressed in simple language, that circumstance alone goes far to show that an adequate conception has been formed of it. On the other hand, there is no condition of the system, however anomalous or obscure, which does not exhibit some symptom or other to which it is easy to apply some nosological term, and, in that disguise, to mistake for the whole matter.

Diagnosis, to be correct, should be methodical and deliberate, interrogating each function in an unvarying order, and deferring conclusions until the time comes for reviewing the symptoms as a whole. By giving a weight and significance to each symptom as soon as it is encountered, we do but increase the difficulty of determining hereafter their common bearing and mutual relationship.[1]

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[1] It may happen, for instance, that the attention of the student is arrested by some physical sign which he accepts as evidence of structural change. Rushing to his conclusion, he constructs upon

A systematic investigation like that which has been sketched out, while it leaves no organ or function of the body unquestioned, will weigh the answers one with the other when the evidence is completed. Such an examination may have several issues. Suppose that, on completion of his review, the student is able to fix upon some one or more organs or parts of the body as the seat of some definite change. In surveying the limbs, œdema is detected ; in the auscultation of the heart, a mitral murmur is heard. These or similar phenomena having been noticed, each in its turn, it is his next object to ascertain the exact place which they occupy in the train of symptoms—to determine, that is, how far the observed lesions have affected other parts, or been affected by them. When this is accomplished, and the whole of the symptoms have found a place according to their order of occurrence, the diagnosis is complete. As examples of what is meant, take the case of dilatation of the right ventricle along with bronchitis, of anasarca along with hypertrophy of the heart and albuminuria, of dysentery together with hepatic abscess, in all of which the point to be determined is the relationship and order of occurrence of coexisting lesions.

It will often happen that the phenomena observed in an individual case are obvious enough in themselves, yet susceptible of more than one interpreta-

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this basis alone a complete theory of the patient's condition. All the while the fact may be, that the sign which has attracted his notice is a mere accident of the case quite unconnected with the present illness, and which could hardly fail to present itself in its true light if judged of in its proper place.

tion; so that, after all the circumstances have been considered, the nature of this relationship still remains matter for conjecture. It may be impossible to determine, for instance, whether an attack of bronchitis succeeding to gout, or the pains which resemble rheumatism in syphilis, are mere accidents of exposure, or the direct consequences of the constitutional state. Circumstances may tend to make probable the one supposition rather than the other, without excluding either. The diagnosis is here incomplete, and the student should place it before his mind as such, discriminating cases like these, which are often made the subjects of confident assertion, from those in which the character of the phenomena and their interdependence are capable of demonstration. Readiness in diagnosis often means nothing more than ingenious or audacious guessing. It is to be attained—or the semblance of it—either by neglecting to take into account the presence of certain symptoms which go to contradict our conclusions, or by failing to notice the absence of others which are necessary to establish them. A superficial and partial view of a case will thus often seem to justify a diagnosis which a deeper scrutiny shows to be untenable.

Suppose, again, that the patient exhibits nothing more than a set of symptoms whose starting-point and connection, and cause, you equally fail to reach. You observe only a number of isolated phenomena while their relationship is concealed—the materials for a diagnosis seem to be altogether wanting. This result may arise either from overlooking some of the features of the case, or failing to recognize in them all that they are calculated to convey. Mere want of skill in physical examination may stand in the way; or the symptoms, though apparently unconnected, may, in that particular combination, have a significance to the experienced observer, from constituting the set phenomena of some specific morbid state. It is necessary in such cases to have recourse to the experience of others. Yet, whenever the student seeks such aid, he must assure himself of the character of the information he receives, and learn from his teachers the precise ground of their assertions. The field of conjecture is as open to him as to them. Outside help is not intended to provide him with a diagnosis, although, by pointing out particular errors and omissions of his, it may be useful at first for settling the materials out of which a diagnosis is to be built.

XI.

THE TREATMENT.

Since the chief concern in practical medicine is to arrive at some means of cure or relief, that consideration is always more or less present to the mind throughout the inquiry. It is apt, indeed, to intrude itself out of its place in connection with single symptoms before the full bearing of these has been fully apprehended. Patients readily dwell upon the particulars of past treatment, although their information can seldom be complete or accurate. We can never expect to learn from them the precise object which the former prescriber had in view, or even the amount of care and judgment that he exercised. It is best to form an independent opinion, unprejudiced by such details. At the same time a knowledge of the bare fact that the individual has been subjected to medicinal or other treatment for a certain period, or that he is addicted to the use of physic, or that he entertains strong opinions with reference to certain drugs, must obviously be of service as contributing to the general history of the case.[1]

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[1] The idiosyncrasies of individuals, though sometimes asserted out of mere whim, will often furnish a valid reason for withholding certain drugs, or giving them with extra caution. We may be too absolute in disregarding the patient's own experience of the effect of such measures as we have adopted for his relief. Intelli-

It is customary to divide treatment into two parts: the one concerns the alleviation of the existing symptoms, the other the removal of the cause on which they depend; but in fact these two points seldom arise, or seldom in such manner as to admit of separate consideration. The disease in many instances is only to be dealt with through its immediate symptoms, the cause being altogether out of reach, either unknown or unassailable. Thus the symptoms may arise from some structural change, which is permanent or irremediable, as in valvular disease of the heart; or from a poison which has found entrance into the system, and which remains there for its own time, as in specific fevers; or from a wholly undetermined cause, as in a host of maladies, especially those of the nervous class. In all such instances the sole aim of treatment is to alleviate the immediate symptoms, or to maintain, by whatever means, the life of the individual so long as they endure. Cure is out of the question. In the attempt to regard treatment in every case as having these two distinct aims, directions given in regard to the latter may resolve themselves into vague general expressions of supporting the strength and avoiding the ascertained provocatives of the complaint.[1]

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gent persons can hardly fail to acquire much accurate knowledge as to *the habit* of their complaints when these are of long standing or recurrent. It is the duty of the practitioner frankly to avail himself of such knowledge; he may do so without surrendering his own judgment, or being misled by the possible prejudice of the narrator.

[1] It is common to warn students against the mere treatment of symptoms; the warning must be understood to apply to a treat-

In considering the question of treatment, such considerations as the following will occur to the mind:

Is the condition remediable, or does it depend upon some structural defect necessarily permanent, or upon a degenerative change which is likely to progress with age? If the former, does the remedy lie in the hands of the physician, or is the affection of that class to which time brings relief with such precautions as common sense suggests? If the latter, what special directions are necessary, so as to place the patient under the most favorable conditions with reference to his complaint?

In directing the patient, it is a good rule to give attention to diet and regimen in the first instance, before entering at all into the question of medicinal treatment.—When the student or young practitioner begins by

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ment addressed to each symptom separately without recognizing their interdependence, or to the treatment of a certain set of symptoms isolated from the rest. We may use the word "symptoms," however, to express the whole of the phenomena presented, in which sense it is obvious that the treatment of the disease and the treatment of the symptoms must be one and the same; but more often we use it, by a purely artificial distinction, to denote certain only of the outward manifestations of disorder; and these, since they are common to many diseased states, can never of themselves be sufficient to indicate the treatment of any. Thus, to treat diarrhœa, or cough, or dropsy, only as such, is to treat it ignorantly, and it may be mischievously; taken in connection with the other signs (as with the temperature or the sounds within the chest, or the state of the urine, all of which are symptoms), it falls into its proper place, and is dealt with in this way or that, directly or indirectly, with all the aids to knowledge which are available. The treatment is not governed by this one symptom, but by all the phenomena of which it forms a part.

prescribing, he is apt to forget that in no case can the whole matter be thus disposed of, and that while directions as to food and conduct must always be necessary, the service of drugs may often be entirely dispensed with.

Most diseases require that explicit rules should be laid down as to the times and quality and quantity of the food and drink; such especially are diabetes and gout, urinary affections, and all the forms of dyspepsia. There are others where the same rigid laws cannot be applied. We want the knowledge requisite for framing them, and must be guided in part by the experience of the patient. In this latter case, by adhering too closely to an inflexible plan, we may be betrayed into expressions which are meaningless, or self-evident as to the precise good or harm of particular kinds of diet; as that the food should be nourishing, but not too stimulating; that if sherry disagree, claret may next be tried; and so on.

In the administration of drugs, not only must the age and previous life and habits of the patient be considered, but also the particular stage which the disease has reached.—The remark applies especially to acute diseases. These run a definite course, and are signalized by certain phenomena which follow each other in a recognized order. Any given symptom, therefore, will depend for its interpretation upon the precise period of the illness at which it occurs; it will have a different signification at different times. As illustrations of this, take the diarrhœa of typhoid early and late in the fever; the high temperature of pneumonia before and after the crisis; the burning heat of a little child in the evening, and the same thing at midday.

It is usually necessary to give some specific directions as to the manner in which medicine is to be taken.—Such directions have reference chiefly to the stages of the digestive process, and the fulness or emptiness of the stomach at the time the drug is introduced—circumstances which bear upon the result no less than the precise form or bulk of what is put there. We know, for instance, that certain aperients require for their action that the stomach should be empty, or nearly so; that, on the contrary, arsenic agrees best when given after a meal; and we suspect that the action of calomel may be affected by salt recently taken, and that alkalies given during the active period of digestion may interfere with that process. Considering, indeed, how large a portion of our remedies are addressed directly to the digestive organs, and how many of them depend for their earlier or later solution and absorption upon the varying conditions of secretion, it must be important in most cases to select some particular period of digestion as being best suited to the particular object in view.

There is nothing in the plan of digestion or the vicissitudes of disease, which need tie us down in our administration of medicine to the formula of three times a day.—The activity of the treatment must bear a due relation to the activity of the disease. I do not mean to imply that active disease is not often best left alone, but only that when medicine is given it must be such as is prompt and immediate in its action. The drug may be directed to the right object, yet given so sparingly or so seldom, that it is quite hopeless to expect that it can ever keep pace with the rapid development of the disease. It may be calculated to convey the right impression; but it will convey it too late, and when the opportunity has passed away.[1]

From prescribing drugs which they seldom see, practitioners are apt to overlook the nauseousness or the unsuitable bulk or consistence of the materials they employ.—The point is of importance, chiefly in the case of children, who in this way are made to endure much needless torture. Certain tastes which are very unpalatable to children may be easily disguised, as scammony and castor-oil with milk, senna with chloric ether, the decoction of aloes with liquorice. Of certain drugs the saccharine preparations should be selected; to others sugar, or the infusion of roses or cloves, may be added. Bulky powders should be avoided; and the dose of fluids should not exceed one or two drachms.[1]

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[1] As examples, we may see such a disease as croup treated with nauseating doses of tartar emetic, which are ordered to be given three times a day, although experience teaches that before the second dose arrives the case may be hopeless. Now, the theory which enjoins tartar emetic enjoins that the influence of the drug shall be brought to bear at once, and continuously—by doses, that is, given at such intervals as may be indicated by careful watching of the effect of each. In the routine manner of prescribing, this requirement is obviously not fulfilled. It is the same with that treatment of acute rheumatism—be it right or wrong—which directs that by means of alkalies, the urine shall be got and kept alkaline. This object can only be obtained by large doses of the drug frequently repeated. To treat the disease by similar doses three times a day, without particular reference to the state of the urine, may be better or worse; it is not the treatment proposed.

Having prescribed our medicines, we have next *to watch attentively the actual effects which they produce* without reference to the virtues with which they are credited, or being biassed by our own motives in selecting them. It is not sufficient to fulfil what are called the "indications" of the case, assuming that the drugs are always true to their character. No medicine is so uniform in its operation as to deserve such confidence. The student will soon discover that the difficulty of producing therapeutical effects is in direct proportion to the number of materials recommended for the purpose. Say that a drug is chosen to produce sweating or diuresis, *it must be ascertained that these objects are actually accomplished*; if not, all justification for the further use of the treatment is taken away. It is idle to persist in it on the ground of its general reputation, yet it is quite common to see drugs administered in this formal way for a length of time, and to hear them praised at last for the cure which takes place in spite of them.

In conclusion, it may not be superfluous to point out that the attitude of the physician towards the patient is that of an inquirer seeking information, in the hope of erecting out of it some consistent hypothesis as to the origin and relationship of certain phenomena. That hope may be gratified, or it may not. It must be obvious in either case that a demeanor which implies a learned familiarity with all that underlies the symptoms and the ability at once to apply such knowledge to the cure of the disease is quite unsuited to the circumstances of the position. In the event of failure, the patient has been troubled in vain—there is nothing to give in return for the facts, which remain without harmony or connection; and in the event of success, the process by which a rational diagnosis is reached is so gradual and laborious, and the treatment founded on it so liable to error, that it is impossible with candor to represent either as the achievement of a superior intelligence.

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[1] There is a legitimate distinction to be drawn between the medication of children and the medication of adults. To the child the process can hardly fail to be grievous; it never affects his imagination except unfavorably. We properly withhold it as far as possible. With the adult the taking of medicine almost always excites a pleasing hope, and no one can doubt that, in some instances, the mere belief in it is of itself salutary.

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